Towards a Framework for the Analysis of CSCL (Computer Supported Co-operative Learning) Discourse

Christina Howell-Richardson

Thesis submitted in partial fulfilment of the requirements for the PhD degree of the University of London

Institute of Education, University of London

2004

I declare that the work within this thesis is my own original work.

Christina Howell-Richardson ---------- Date 20 July 2004

ABSTRACT

The thesis aims to develop a possible description of electronic discourse in CSCL through a data-driven description of the linguistic behaviour and discourse strategies of 4 groups of postgraduate students engaged in an asynchronous CSCL task during February 2000 and February 2001.

The study develops an analytic framework for the coding of the messages. The framework consists of three levels, with a default inheritance relationship between these levels. The top level concerns the aim of the messages, identified within the broad context of Levinson's Activity Type. The mid-level consists of the traditional conversational analysis categories, with some minor adaptations to the CMC medium. The third level is based on a neo-Gricean approach to utterance interpretation, with special attention to Levinson's (2000) theory of generalised conversational implicature.

The analysis was conducted through intensive reading of the coded data to identify categories of speaker behaviour. The categories were then collated to address the research question. 19 categories were identified, covering 4 aspects of discourse behaviour.

As an additional test of the discourse analysis framework, the coded output was used as data for a separate theory-driven question. The question was to seek evidence of behaviour typical of the iterative dialogue that characterises Laurillard's (2002) model of learning through conversational dialogue.

The research study found that the majority of the discourse categories identified by the framework are valid, although some need to be refined. In particular, 4 basic message structure types, and distinctive patterns in the use of indirect and direct forms of expression are clearly identified in this data. There are also clear indicators of strategies used to maintain cohesion and coherence. In the test case, the coded data was used to identify six types of critical learning behaviour that are broadly consistent with Laurillard's model of learning.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

CHAPTER 1: INRODUCTION

1.1. DEFINING THE TASK

The use of computer-mediated-communication (CMC) is now widespread in education in the UK. CMC is used for networked learning between schools, as the basis for the development of virtual universities and colleges, as an additional learning platform within campus-based learning (Crook 2002) and to aid the development of flexible and work-based learning in the Higher Education sector (Darby 2002).

The term CMC is a generic description for all types of communication involving networked computers. Some of the best-known types of CMC are e-mail, video-conferencing, message boards, chat rooms, and computer-conferencing. This thesis is concerned with asynchronous, text-based computer conferencing, which Fahy (2001) has described as ubiquitous in distance education. Within this thesis the term CMC is therefore used to refer only to asynchronous, text-based communication.

This type of CMC allows a relatively high degree of flexibility since, once the software licences have been purchased by the educational institution, communications can be conducted across geographical and time zones, and can be accessed from the individual's own home by simply using an Internet service provider. Further, asynchronous, text-based communication provides the user with the opportunity to read the conference transcript and to compose a message before contributing to the conference, thus reducing the pressure of providing an immediate response. These features facilitate the participation of non-native speakers and others who have been traditionally restricted in their access to educational courses (Coombs 1989).

However, it is still a fairly recent phenomenon and research into the use of CMC for distance learning and educational group work is still only less than thirty years old (Jones and Steeples 2002:1). Much of the early research work sought to establish whether the

social dimension of CMC could support critical discussion, problem-solving and joint decision-making that are central to learning activities (e.g. Hiltz et al 1978, Kerr and Hiltz 1982, Kiesler et al 1984). Other early studies, which set out to evaluate the effectiveness of CMC for course delivery, concluded that when successful the quality of online educational courses can equal or even surpass that of traditional modes of delivery (e.g. Harasim 1990, Hiltz 1994, Kaye 1992).

Further research has addressed the development of teaching and learning models for CMC-based courses. The potential of the medium for multi-party dialogue has been a particular focus for this research, as it offers a natural platform for a social constructivist approach to learning and knowledge building. According to this approach learning is situated in culturally specific activities. It is also active and participatory. It involves individual learners in actively interpreting and forming conceptual representations of their experience. It also involves engagement in individual meta-reflection on this representation, based on the alignment of the representation with the experience of acting on the world. Moreover, the constructivist approach to learning is concerned with theoretical, conceptual objects of learning as well as with the practice-based learning models originally associated with Lave and Wenger's (1991) theory of situated learning. Within the field of CMC pedagogy this approach to learning has found a natural partner in the paradigm of co-operative and collaborative learning (Goodyear 2002, Jones and Asensio 2002, McConnell 2000). As a result computer-supported collaborative learning (CSCL) has emerged as one of the dominant paradigms for CMC-based educational courses.

In contrast, attempts to develop content analysis schemes for research on online learning groups, and for the purposes of evaluation, have been less successful. The purpose of content analysis in this context is fourfold: (i) to uncover the ideational (propositional) content of the messages in the discussion (ii) to investigate how topics are developed in an online discussion (iii) to investigate the participant and dialogue roles adopted by learners (iv) to investigate the ways and extent to which learners engage in deep-level learning. Content analysis therefore provides us with information on the types of

exchange that take place in online learning groups, and how learners develop (or fail to develop) conceptual understanding through text-based dialogues with peers and tutors in an altered, and under-researched communications environment. This information aids researchers to construct theoretical models of the learning processes participants engage in online learning groups.

Several attempts have been made to develop schemes and frameworks to analyse CMC transcripts for evidence of cognitive processes associated with a constructivist and deep-level approach to learning (e.g. Fahy 2001, Gunawardena et al 1997, Henri 2002, Newman et al 1995, Rourke et al 1999), but none have been evaluated as satisfactory to the purpose.

While the difficulties in developing an effective content analysis scheme for CMC have been attributed to different reasons, certain common issues have emerged. Gunawardena et al (1997) attribute part of the difficulty to the lack of an established theoretical underpinning to guide the development of such schemes. In particular, there has been little, recent educational research on the social dimension of online learning and the ways in which participants in these groups adapt their behaviour to the environment to manage their interaction and to achieve their goals. There are descriptive models for the developmental stages of online learning groups (e.g. Salmon 2000, 2001), and several authoritative accounts of techniques for the management and facilitation of these groups (Harasim et al 1995, Preece 2000, Tolmie and Boyle 2000, Salmon 2002a). However, development of a theory of ways in which the social context of the virtual environment impacts on learner behaviour remains a research task (Fahy 2001, Rourke et al 2001)

Further, there are no established descriptions of the register of online discourse, which would inform research on the ways in which participants adapt the way they use language in the altered communications conditions of the CMC environment. Those research studies that have been concerned with a linguistic analysis of CMC discourse have been exploratory and descriptive in nature (e.g. Collot and Belmore 1996, Davis and Brewer 1997, Ferrara et al 1991, Wilkins 1991), or have focused on specific aspects of the

discourse, such as strategies for cohesion and coherence (Herring 1999), the functional structure of the message (Herring 1996), or use of rhetorical questions (Davis and Brewer 1997). As a result, while certain common patterns of language use have been observed within these studies, our knowledge of language use and communications behaviour in online learning groups is fragmentary.

Register is a variety of language use. It is a system of linguistic expression, which is governed by situational factors. Establishing a full description of the register of electronic discourse, and specifically for the discourse of online learning groups, informs us on the systematic ways in which meaning is conveyed online, how the dialogue is structured and how communications and task goals are achieved. Describing the register therefore allows us to analyse language use online more reliably so that interpretations can be made about the cognitive and ideational aspects of the dialogue.

Moreover, a number of methodological issues have been identified in the design of content analysis schemes developed for the research and evaluation of learning in online groups. The main concern is lack of reliability and replicability in the methodologies used (Fahy 2001, Rourke et al 2001) and few of the studies reported have been extended beyond a small-scale case study.

Firstly, very few studies have addressed the issue of identifying procedures for the interpretation of propositional content. Many content analysis schemes, developed for analysis of CMC transcripts (e.g. Henri 1991, Fahy 2000), rely upon general descriptions of different types of talk, distinguishing for example between statements of personal disclosure, indirect questions or critical commentary. Categories are thus developed on a rather ad hoc basis and many of the coding categories proposed in these schemes are difficult to define and apply (Hara et al 2000, Rourke et al 2001).

A second methodological issue is lack of consensus among researchers over the unit of analysis. Rourke et al (1999, 2001) identified five different units of analysis that have been used for content analysis of the transcripts of educational CMC. This thesis has

identified a total of seven different units of analysis. In a research area where relatively few content analysis schemes are cited in the literature, this lack of consensus has hindered comparability between the results of these studies. Moreover, as many of these content analysis schemes address several different analytic dimensions in parallel, in practice it has proved often not possible to sustain a single unit of analysis across the levels of the analysis (Hara et al 2000, Henri and Rigault 1996, Fahy 2001).

A third, common methodological issue is the difficulty of identifying in the online discourse reliable indicators of the cognitive processes that can be assigned to the coding categories. There are several recent frameworks[1] for analysing cognitive processes online, for example Pohl's (2000) use of Bloom's taxonomy, Fahy's Transcript Analysis Tool (2000), Garrison et al's Practical Enquiry model (2001). However, the indicators suggested for the coding categories are not based in research on language use, and are not specifically adapted to take account of modifications to participant behaviour in the online environment.

As a contribution to the work in this field, the approach taken in this thesis is to develop a framework for the content analysis of CMC transcripts, which is based in linguistic theory in order to address some of these methodological issues.

1.2. A LINGUISTIC APPROACH TO ANALYSIS OF CMC TRANSCRIPTS

The aim of this thesis is to use linguistic theory as a means to investigate the ways in which participants in online learning groups adapt their communicative behaviour to asynchronous CMC, and to provide a means to analyse and interpret the meaning of messages.

---

[1] In addition to those cited in previous paragraphs.

The branch of linguistics chosen for this purpose is pragmatics. Pragmatics is a specialist area concerned with the theoretical modelling of language use and the interpretation of speaker meaning within socio-cultural contexts. The cornerstones of pragmatic theory are Gricean theories of meaning (Grice 1957, Levinson 2000, Sperber and Wilson 1995) speech act theory (Austen 1962, Searle 1969, 1975) and Conversation Analysis (Sacks et al 1974, Sacks 1992a, 1992b). Gricean theories of meaning provide a comprehensive framework to model the inferential processes of interpreting the meaning conveyed by a speaker's particular choice of words. Speech act theory identifies the conditions for the interpretation of a speaker's intention in an utterance. Conversation Analysis identifies the ways in which participants in a dialogue (including multi-party talk) negotiate their conversational aims through the ways that they structure the talk and the types of conversational moves used.

All of these theories are well established, with an extensive, empirical research base. This thesis develops an analytic framework based in these theories for the content analysis of CMC transcripts, to interpret at the level of the unit of analysis what is said (propositional or ideational content), how it is said (language use), the speaker's intention and the way in which the unit of analysis fits into the structure of the conversation. This information can then be collated to map topic development, the rhetorical structure of the argument within the discussion, and the learners' conceptual development in relation to the subject material.

Further, these pragmatic theories are general theories of communication, which cut across the spoken/written divide and can take into account the affordances of a communications medium as an aspect of context. An advantage of using pragmatic theory as the basis of the content analysis is therefore that these theories do not impose on the analysis models of communication, which have been developed specifically for face-to-face or other forms of audio-visual mediated interaction. Instead, these theories can permit an analysis and description of how participants in CMC learning groups use language.

Use of linguistic theories, which include clearly defined procedures for the analysis and interpretation of language use, also addresses some of the methodological issues identified as a concern in the development of content analysis schemes for CMC. Firstly, Gricean theories of meaning, and to a certain extent, speech act theory, are centrally concerned with the interpretation of propositional meaning and the theoretical and analytic frameworks developed by Grice and the neo-Griceans can be systematically applied in the analysis. Secondly, as the unit of analysis in CMC transcripts is by definition a unit of connected "speech" (talk), it is appropriate to use linguistic theory to define the unit. This has the advantage of arriving at a rigorous definition of the unit, which can be replicated and consistently applied. Thirdly, basing the analysis of speaker meaning in linguistic theory contributes to the identification of indicators of cognitive processing by providing a methodologically rigorous and motivated interpretation of the unit of meaning.

Finally, the task of this thesis is to use linguistic theory to analyse and describe the ways in which participants in a CSCL task organise their discourse and how they convey and interpret meaning. Use of linguistic theory provides clearly defined and established methodological procedures for conducting the analysis. It is therefore intended that the analysis will contribute to the description of the register of CMC discourse, which can be used to inform other fields of educational research, which use the language of CMC learning groups as primary data.

1.3. OUTLINE

This thesis has a narrative structure and is divided into seven chapters.

Chapter 2 presents the review of the literature and is divided into three main sections. The first section presents an overview of research relevant to the online context. Three aspects are addressed: the social dimension of online communications, the linguistic forms and strategies used and the design and management of online educational courses. The second section examines the principles and practices of co-operative and collaborative learning,

with particular reference to CSCL. The final section of chapter 2 reviews a range of existing content analysis schemes for CMC transcripts.

Chapter 3 presents the arguments for a theory of utterance interpretation on the basis of which the analytic framework is developed. The chapter focuses on Gricean approaches to utterance interpretation and meaning, and considers specifically the developments of Grice's original theory made by Relevance theory (1986, 1995) and Levinson's (2000) theory of generalised conversational implicature. The chapter concludes that the framework should be based mainly in Levinson's theory, but should include elements of Grice's original model.

Chapter 4 presents the analytic framework developed for this thesis. It includes a discussion of how the design and use of the framework addresses a number of the methodological issues that this research has identified as weaknesses in earlier content analysis schemes.

Chapter 5 presents the research methodology of this thesis. This includes an example of the coding method, using the analytic framework developed to code a set of twelve messages from the transcript. The analysis was conducted through intensive reading of the coded data to identify categories of speaker behaviour. Nineteen categories were identified, addressing 4 types of speaker behaviour:

- Four types of basic communicative message structure. These perform communicative functions: (i) default/neutral, (ii) interactive, (iii) conveying given information, (iv.) conveying new or risky information.
- Patterns in the use of indirectness and directness.
- Cohesion and coherence strategies.
- Conversational repair strategies.

The categories were then collated and the results entered into an Excel database to perform a simple quantitative analysis to examine patterns of distribution. The results of the analysis are also presented.

Chapter 6 discusses and interprets the results of the analysis. Establishing the extent to which they are consistent with the evidence presented in the literature review assesses the reliability of the results and of the claims of the analysis. Chapter 6 also contains an evaluation of the research methodology.

Chapter 7 reflects on the practical and theoretical implications of the research for the three areas addressed by the study: research methodology, the description of CSCL discourse and the potential of the analytic framework developed as a tool for evaluation of CMC-based courses. The chapter concludes with a discussion of possible directions for further research suggested by the work undertaken in this thesis.

CHAPTER 2 REVIEW OF THE LITERATURE

2.1 INTRODUCTION

Since computer-mediated-communication (CMC) systems have been available in the public domain, sociological research has been conducted from a variety of perspectives and through a variety of methods. Over the passage of time, the interpretation of the research objective has progressed from early concerns with the efficiency and effectiveness of CMC systems for information exchange and decision-making, through studies of uptake and usage in specific contexts of use, to a wide range of research studies on educational applications of CMC and on user behaviour in educational and other contexts (Paccagnella 1997).

A significant feature of the development of research interests in CMC has been a movement away from the technological determinism argument towards an interest in the study of CMC as a context for communication (Davis and Brewer 1997, Metz 1994, Salmon 2002b). The technological determinism approach studies how the affordances of the channel support and affect communication. An alternative approach is to look at how users adapt their communicative behaviour in this computer-mediated context. Support for this approach can be found in a number of different sources, including the philosophy of social constructivism, empirical evidence of users creating social worlds online (Baym 1992, Paccagnella 1997, Spears and Lea 1992), the success of the phenomenological approach in the study of social behaviours (e.g. Jones and Asensio 2002) and learning styles and behaviour (Laurillard 2002, Marton and Booth 1997).

The aim of this research study is to develop a discourse-based, content analysis scheme for online learning. One purpose in developing this type of scheme is to provide tools for the evaluation of online learning that are not based on objective measurements of final performance, but examine learning in process. However, this has proved difficult to implement (Goodyear 2002, Newman et al 1995). The main reason for this is that there is still insufficient information on the context and nature of online learning. While

pedagogical models have been developed (e.g. Harasim et al 1995), research continues into learners' use of the online context (Steeples and Jones 2002) and into the psychological principles underlying CMC-based learning (Goodyear 2002). Further, there is still only a relatively limited body of research on the linguistic forms and strategies used online (Crystal 2001).

Understanding the nature and context of online learning is pre-requisite to identifying behaviours and principles of online management that provide a basis for judgements of effectiveness and quality in learning. This chapter assesses what is known about the context and psychological processes of small group work in text-based online learning environments, and reviews existing content analysis schemes.

The chapter begins with an overview of research relevant to the description of the online context. Three aspects are addressed: the ways in which users adapt their social behaviours to this context, the linguistic forms and strategies used and the ways in which educational course designers and managers of online learning have adapted their craft and design principles to the online context. The central section of the chapter examines the core principles of co-operative and collaborative learning approaches, which remains one of the most prevalent models for online learning. This section proceeds to a discussion of the phenomenological approach to learning, as a framework for deep-level learning. The final section of the chapter reviews existing content analysis schemes with a view to assessing the extent to which these schemes are reliable and replicable, and to establish principles for the development of a similar scheme.

2.2. CMC AS A SOCIAL, DISCOURSE AND EDUCATIONAL CONTEXT

The aim of this section is to describe the ways in which educational users appropriate asynchronous, text-based CMC systems. This will be done in terms of users' social and linguistic behaviour and through looking at the factors affecting online course design and learner management. As the focus of the research is interaction and communication within the virtual spaces of a computer-conferencing software system, like LotusNotes or

First Class, there will be no discussion of off-line user behaviour, even though it is acknowledged that this contributes to the online behaviour. The discussion is restricted to what is commonly accessible to all participants in the conference.

2.2.1. Social Behaviour

2.2.1.1. Early research studies

At the time of the emergence of CMC as a viable medium for large-scale communications one of the most influential theoretical frameworks for analysing technologically mediated communication was the social presence model (Short et al 1976.) According to Short et al the critical factor in a communications medium is its capacity for 'social presence'. Social presence is conceived as a factor comprising a number of dimensions relating to degree of interpersonal contact, and is closely related to perceptions of 'immediacy', 'intimacy', 'sociability' or 'warmth. Although CMC was not included in the study, initial predictions supposed that text-based computer conferencing would be effective for tasks involving low social presence such as information exchange and question/answer exchanges but less satisfactory for tasks requiring higher social presence functions such as establishing personal relationships, negotiation or collaborative project work.

Initial research into the properties of CMC as a communications medium was dominated by two research programmes, Hiltz's research team at NJIT, New York and the Committee on Social Science Research in Computing at Carnegie-Mellon University. These programmes published the first reports on controlled research experiments into the social features (cf. technical features) of CMC use. The focus of attention was identified as the analysis of group work and group interaction, with particular reference to comparisons of task-oriented and interaction-oriented behaviours in face-to-face and computer-mediated conditions. Both Short et al's social presence model and Bales' research on face-to-face group interaction (1950, 1955) were influential in informing the research direction.

The NJIT programme (Hiltz, Johansen and Agle 1978; Hiltz, Johnson, Arnovitch and Turoff 1980; Hiltz, Johnson and Turoff 1986) sought to examine outcomes of CMC interaction in terms of task performance and social dynamics. Taking Bales' (1950, 1955) work on interaction in problem solving groups as the theoretical framework, the objective of the field trials was to analyse the social dynamics of small online groups when required to reach consensus on a problem-solving task within a specified time. Behaviour was coded using Bales' Interaction Process Analysis scheme. The findings of these studies, which were ratified by an independent replication of the experiment (Adriansen and Hjelmquist 1985), indicated three statistically significant differences between the interactions in face-to-face and CMC. Firstly, in CMC mode users expressed agreement and disagreement considerably more overtly then in face-to-face, although disagreement was not as explicitly communicated as agreement in either mode. Secondly, in the computer-mediated meetings there was a much higher incidence of participants giving their opinions. Thirdly, a separate measurement of the distribution of messaging among the subjects of the experiment indicated a statistically significant tendency for more equality in the CMC discussion mode. It was also noted that while groups in face-to-face mode succeeded in both completing the tasks in the allotted time and in reaching consensus on the task, in CMC mode the groups did not achieve either objective.

When interpreted in the light of Bales' research, these findings seemed to confirm the initial predictions suggested by a rating of low social presence. Bales' work indicated that there is a social pressure on groups to conform. His work also showed that one or a few group members often dominate the problem-solving process. In addressing the processes that produce this dominance Bales (1955: 34) states that a participant, who is quick to respond to the problem posed and also subsequently contributes and therefore receives a disproportionate number of speaking turns, is most likely to be regarded as the group leader. The group will then strive towards convergence with the views of the dominant member or members. It therefore seemed reasonable to assume that the observed outcomes of the CMC problem-solving experiments could be attributed to the ways in which the medium constrained the processes of interaction and specifically to absence of audio and visual cues and to the loss of temporal immediacy (Hiltz and Turroff 1993).

The independent set of studies conducted within the research programme at Carnegie Mellon University lead to the Reduced Social Cues (RSC) theory (Kiesler et al 1984; McGuire et al 1987, Siegel et al 1983; Siegel et al 1986, Sproull and Kiesler 1986). The theory states that the paucity of social context cues and the absence of shared norms governing behaviour result in deindividuation. Deindividuation implies a lack of self-awareness and reduced self-regulation leading to anti-normative behaviour, and it is typically observed when people are submerged in a group that is predominantly task or action focused.

> "To be effective, rather than aiming at objectivity, groups may need affective bonds, a status distribution that helps sort out multiple objectives and hierarchy that determines influence, even if these behaviours interfere with "good" decisions.....For accomplishing these purposes, the social structure provided by roles, norms, and status and reinforced by trust and personal engagement with others is critical."
> Kiesler et al (1984 1127)

The RSC theory is that the absence of social and normative influences, caused by the low social presence rating of CMC, affects social behaviour in three ways. Firstly, the focus is on the information content of the exchange at the expense of consideration of interpersonal factors. This makes social co-ordination within the group difficult. Moreover, secondly, there is low probability of the spontaneous emergence of a group leader. Thirdly, the reduction in social cues removes the normative constraints that act as a brake on the expression of extreme views. As a consequence there is high probability of polarisation in the arguments presented, and the expression of hostility. It therefore follows that CMC should not support group work or collective decision-making.

These studies formed the basis of an initial social theory of CMC. However, it is important to bear in mind that these studies were set within a specific temporal and cultural context within the evolution of telecommunications media in general and of CMC in particular. Therefore, certain of the conceptual parameters for the design of the

experiments and for the interpretation of the findings are now considered unsuitable to account for the types of use being made of CMC.

Firstly, by virtue of being controlled experiments these studies produced conditions too far removed from those typical of practice in natural conditions to give accurate information on the nature of group processes in CMC. This methodological weakness is apparently confirmed by comparison with other more or less contemporary observational studies (Hiltz 1984, 1993; Hiltz and Kerr 1982, Rice and Love 1987).

Secondly, the theoretical frameworks for the experimental designs were heavily influenced by Short et al's social presence theory and Bales' group decision-making experiments. While at the time this was a valid research base to draw upon, it had the effect of restricting the contexts of the studies, the experimental designs and the possible interpretation of results. Under the influence of the social presence model the majority of the experiments were concerned with cross-media relativity, with face-to-face interaction being taken as the paradigm against which CMC was measured. Thus the temporal, task and communications support variables were set by the criteria of the most effective and/or natural combination in face-to-face mode.

Further, a number of studies were conducted during the late 1980's that contradicted the RSC theory. In particular, a major observational research study by Rice and Love (1987) indicated that the proportion of message exchange with social or emotional content is not automatically lower in CMC groups than in face-to-face mode, but is context-dependent. They went on to conclude that where CMC interaction differs from face-to-face, and where the opportunity for greater equality of participation and the reduction in social cues combine, is in the changes to the illocutionary effect of utterances which have been stripped of accompanying paralinguistic communication signals. Like the major early research studies, they also noted a higher likelihood of antagonism among CMC groups.

Online antagonism was so frequently observed in the literature the term 'flaming' was borrowed from the computing sub-culture to refer to it. Two laboratory studies, which

focused specifically on the effects of features of context on flaming, supported Rice and Love's modifications to the prevailing account of social behaviour in CMC (Hiltz et al 1987; Smolensky et al 1990). Both sets of studies (on decision-making in CMC) show that uninhibited speech varies in intensity depending on the type of task being worked on, the relationships of group members and the personality traits of individual group members.

Finally, two major, longitudinal, ethnographic studies (Kerr and Hiltz 1982, Zuboff 1988) of users' appropriation of the medium in natural contexts of use provided a body of empirical evidence that social presence could indeed be developed online. The studies also showed that changes in contextual features resulted in changes in social behaviour and in the amount and direction of the information flow (Hiltz and Turoff 1985).

2.2.1.2. Current views on the social dimension of CMC

Another criticism of the RSC view of CMC is the use of the term "social", which is very vaguely equated to any information carried through audio-visual cues. Spears and Lea (1992) note that when discussing social cues the term "social" should refer to both *social category* information, which is signalled by age, gender, occupation etc, and *interpersonal* information, which concerns an individual's personality, attitudes and self-presentation. Other research on CMC usage shows that "social" can be used to refer to the creation of different kinds of educational contexts online (managed learning environments). It can also be used to refer to the phenomenon of virtual communities (Preece 2000). Each of these definitions will be addressed in this section.

One of the strongest claims to have been made for CMC is its potential to support more egalitarian patterns of interaction. This position, held by various authors (e.g. Herring 1993, Hodgson 2002, Kaye 1992), can be described as the 'democratic theory' of CMC. Harasim's formulation of the argument is typical:

> "Text-only communication can free people from the bonds of physical appearance and enable communication at the level of ideas. For example,

> in face-to-face situations physical and social status cues extend authority and influence over others. Cues such as dress, presentation, voice intonation, and seating arrangement denote power, leading to unequal communication between people.....Communication in the networld is "blind" to vertical hierarchy in social status."
> Harasim (1994:26)

Thus, it has been noted that CMC promotes access to information and human resources for social groups, such as the disabled (Coombs 1989), home-based carers and ethnic minorities, who have traditionally been disadvantaged in their participation in social, political and educational contexts (Harasim 1994:26, Hiltz and Turoff 1993: 165-184). Nevertheless, while certain types of social category information are concealed, other types are implicitly conveyed online (Yates 1997). Firstly, in the global context access to online facilities implies a social and cultural status; the privileged side of the digital divide. Although ownership of personal computers is increasingly common, access to CMC and the Internet is still restricted. The reasons for this are mixed and involve economic, educational and cultural factors. For example, in terms of gender, Yates (1997) presents evidence from a 1996 global survey of 15,000 UK Internet users, which indicates a one third female, two-thirds male split. In Europe the survey suggested an even more pronounced difference. Restrictions on access and usage are even more acute among other national, socio-economic and ethnic groups. Rates and frequency of interaction can also be markers of social and occupational status.

Moreover, all texts carry markers of their authors in one way or another. One obvious marker is the message header that carries information on the user's name and institutional affiliation, with high status institutions clearly identifiable (Crystal 2001). Herring (1992, 1993) also found differences in the CMC practices of men and women, reflecting social constructions of gender roles, and the discourses and discourse practices associated with these differences in general social life. Herring explored two international mail-based discussion lists serving the academic population. The proportion of female participants was slightly higher then the norm suggested by Yates' 1996 survey, but consistent with the slight distortion that might be expected within a population of academics; 36% on the Linguist list and 42% on the Megabyte list. Her results showed that women use a

messaging style, representative of what has been referred to by some writers as women's preferred style of talking (Coates and Cameron 1988, Tannen 1991). The women use what Tannen calls "rapport" talk, whereas the men use "report" talk aimed at maintaining autonomy and status.

Herring found that women contributed less than their male colleagues in general, and that the mean length of their messages was shorter. Differences were also noted in topic selection. Despite their professional background, the women in these lists participated more actively in a debate on sexism than in theory-related discussions. Men exhibited more information-focused behaviour and were more likely to post messages dealing with specific topics and containing specific points of information. Women, on the other hand, were more likely to make general comments or to post queries specifically addressed to other members.

Herring also noted gender differences in language style and message content. Using a typology of features defined by their attribution to male or female language styles, her analysis uncovered a number of gender differences. Of the messages analysed, 68% of women's postings displayed some features typically associated with feminine language styles, as compared to 31% of messages posted by males. On a measure of messages containing features associated only with masculine speech styles, she found 48% of messages posted by males exhibited this trend as compared to 18% of messages posted by females. She concluded that, despite the absence of face-to-face cues, gendered behaviour is represented in the form and content of the messages.

It can be argued that the adoption of typically gendered ways of talking and interacting is a conscious strategy to construct a social identity online (Hodgson 2002), as in the case of gender bending (Mackinnon 1995, Paccagnella 1997). Moreover, McConnell's study of gendered behaviour among post-graduate learners found no conclusive differences on measures of turn taking or topic initiation that would unequivocally support Herring's conclusions. He (2000:106) suggests that the culture of the learning programme; the

goals of the individuals and local circumstances of access and personality have a greater influence on interactive styles than gender.

Therefore, while off-line social relations and behaviours are almost certainly transferred to CMC contexts, there is both the scope and the necessity to project an identity online, equivalent to the way we present an identity through the settings of our habitual environments (Goffman 1959, 1969) in our everyday lives. Goffman's ideas on the presentation of self are applied to CMC through the notion of the 'persona' (Branscomb 1994:99; Mackinnon 1995; Reid 1995: 178-179). The notion of a CMC persona is roughly equivalent to a 'dramatis persona'. It has no independent existence from the user, whose actions and personality it represents in the CMC environment. Users cannot avoid being 'represented' by their online persona since CMC filters out all non-text cues, but at the same time the 'persona' may not be a true representation of the user. Mackinnon explains the relationship as follows:

> "It has been established that the medium of written communication interferes with the transfer of the users' external world social structures into Usenet. By the same means written communication interferes with the transfer of the users' personalities and unique qualities as well. The result is the creation of 'personae' which are as distinct from the users as Usenet society is distinct from the external world.....[But] within Usenet, words are the sole means of characterising the network's universe. Thus wordmanship in Usenet is a far more valued skill than in the external world. Consequently, possession or lack of this skill can inadvertently give the Usenet user a radically different persona from him or herself. Accordingly, a command of written language can empower a persona in Usenet beyond the relative strength of its user in the external world."
> Mackinnon (1995:118)

Using the notion of the persona to apply Goffman's principles to CMC has greater explanatory use than the reduced social cues (RSC) approach. The notion of the persona provides a recognisable construct for CMC skill, which includes skill in written communication to project a persona that resembles oneself, or an intentional projection of an alter ego (Hodgson 2002). Once such a construct is established, it becomes clearer what is being referred to by variation in user competence. It also provides an explanation

for mismatches in off-line and online personality. Lastly, like the RSC model, this metaphor provides an explanation of why some CMC users feel consistently disoriented, while others feel liberated. Perhaps its greatest value is that the notion of the persona allows us to recognise that some of the bases of social hierarchies in CMC contexts are different from those in face-to-face.

For example, as CMC is a system for exchanging and accessing information, information is one of the main currencies of power. Those who have information that is prized by others, or have particular network expertise and can act as information brokers or navigation pilots, acquire a status in CMC that they may not have in other domains. Thus, there is a tendency for information elites to form in CMC.

Finally, there is the question of how the possession of power and status can be recognised online. According to Bales, in face-to-face contexts the possession of power can usually be recognised by the amount and distribution of talk, with those holding power contributing considerably more talk than others. The conversation analysts (e.g. Sacks, Schegloff and Jefferson 1978) show that a current speaker can direct the course of the interaction through the type of message delivered and through non-verbal cues. Conversely, in asynchronous CMC, where paralanguage cannot be used to maintain speaking turns or to choose the next speaker, the power of deciding whether to respond or how to respond rests principally with the recipients of the message and not with the sender (Crystal 2001, Herring 1993, Mackinnon 1995). It follows that messages from those who are perceived as influential online will consistently elicit a greater number of responses from a wider selection of participants than those without such power. In contrast, lack of response to a message, particularly if addressed to a particular individual, is an expression of the power of the recipient. Thus, in CMC contexts it is not solely the amount and distribution of talk that is relevant in describing patterns of interaction but also the direction of the messaging. This can be easily traced in CMC by recovering the message threads and by using simple interaction analysis methods (e.g. Howell-Richardson and Mellar 1996, Hara et al 2000).

The term "social" refers to group identity, and the emergence of shared meanings, as well as personal, individual identity. A group identity may be forged through the mediation of external managers, in managed virtual learning environments, or may arise more spontaneously as a natural online community.

Evaluations of the UK Open University's first presentation of the DT200 course (e.g. Mason 1989), which was among the first experiments with large-scale online teaching and learning, include many of the features now recognised as typical of poorly managed and otherwise unsuccessful online courses (Tolmie and Boyle 2000), in which a group identity is unlikely to emerge. These include poor levels of participation (Salmon 2000:37) and the formation of dominant exclusive cliques, high proportions of lurkers (Preece 2000: 87), superficial discussion or frequent topic drift and topic decay (Herring 1999; Mason 1989) and lack of direction in task completion (Calvani et al 1997). It is now considered essential to manage the learning environment through course design and through the day-to-day process management of the interaction (known as e-moderation or e-facilitation). The issues and practice of online learner group management will be discussed in 2.2.3.

Group identities are also fostered in naturally occurring online communities. Preece (2002) offers a comprehensive survey of online communities. She (Preece 2002:10) defines these communities as consisting of the people who make up the community, their shared purpose, which provides a reason for the community, the tacit protocols and procedures which govern the community's behaviour and the computer systems used to mediate the interaction. Following his seven year involvement in the WELL, an early online community, Rheingold (1994:58) described online communities as environments where " We do everything people do when people get together, but we do it with words on computer screens, leaving our bodies behind...."

The central concerns of any community are reciprocity (Preece 200:87), co-operation and trust. Reducing the likelihood of anonymity and fleeting interactions, and fostering the need for group interdependence to achieve a common goal produce these conditions.

Encouraging a group identity and empathy between individuals aids this process, and many virtual communities are tied in with regular face-to-face meetings (e.g. McConnell 2002). Nevertheless, while personal meetings are important, the online community will not thrive if their purpose for meeting online is not clearly focused, shared and supported (Crook 2002).

One measure of the success of an online community is the ways in which users appropriate each other's behaviour. Baym's (1995) ethnographic study of social dynamics in an open, online discussion group interprets appropriation as a process of participants drawing upon the resources available through the medium and selecting from and adapting use of these resources to serve their own purposes. She sees this process as one of forming relationships, negotiating group-specific meanings and group-specific norms for the organization of their interaction.

Baym's analysis is operationalized within a theoretical framework that implements a 'cultural capital' perspective on social organization, and which challenges the notion of emergence of community in an online environment differently than the RSC approach. Influenced by Bourdieu (1977), Baym approaches culture as a system dynamically recreated through the interplay between the structures that exist for organising social interactions and the practice of everyday life. According to this philosophy, to achieve even the most mundane of interactions people draw upon pre-existing cultural resources, which have a shared meaning within the community, to create and invoke event types, identities and social norms. It is through the use of such resources to create new social meanings that a culture is continually modified. The theoretical challenge, which this perspective brings to the discussion of online communities, arises from the understanding that the pre-existing structures, which create social meaning, are a complex of all the resources within a culture. This includes cultural symbols like artefacts, folklore, buildings and the social behaviours they invoke, all of which exist as an external representation of the evolution of social practice within a culture and as cues to social behaviour. As a consequence the issue raised regarding CMC social behaviours is how

appropriation demonstrates adaptation of existing social practices to find ways to invoke shared meanings in a new context.

Baym's study is an analysis of a large, unmoderated Usenet discussion group for television soap opera fans. Baym identifies four factors as markers of the emergence of community, in the sense of appropriation. These are: the creation of new forms of expression; the exploration of possible new identities; the creation of otherwise unlikely relationships and the creation of behavioural norms which are followed by members of the community and include group action against breaches of acceptable behaviour. Her analysis finds empirical evidence for each factor. Possibly, the most significant conclusion from this study is the emergence of group-specific forms of expression and the pressure created by the group to ensure acceptable behaviour among its members. Both factors indicate social bonding, despite the large numbers involved and the absence of moderation. Nevertheless, the context and topic of this group may have produced fortuitous results.

There are few large-scale studies of appropriation in online discussion groups to draw on. However, Davis and Brewer's (1997) four-year case study of an online, literary analysis course supports Baym's findings. Davis and Brewer found that as the individuals in the groups developed social bonding, they would emulate each other 's words, sentences, phrases and message styles as a means to form an in-group identity. They also use the ornithological metaphor of "flocking" (Davis and Brewer 1997: 137) to refer to the migration of a group to a new topic, taking with them the shared history developed in earlier online tasks.

Appropriation is therefore taken as evidence that there is indeed potential for social presence and social identity online.

Summary

This review of social identity online concludes that there is the potential for social presence and social grouping in online environments. However, constructive social

behaviours are most likely to occur where the environment is carefully structured and managed to promote a shared purpose for the interaction, a sense of group identity and group interdependence, and the usability of the information flow.

2.2.2. Linguistic Behaviour

In a text-based, computer-mediated environment users' linguistic behaviour is central to a study of their adaptation to the context. The literature on "electronic discourse" consists mainly of small, detailed case studies. Nevertheless, collectively these studies have begun to identify levels and aspects of shared usage within their individual situations and across the situations described. Having established that electronic discourse is not a new genre, one central concern for linguists is to arrive at a description of this discourse type as a new register (Crystal 2001, Davis and Brewer 1997, Wilkins 1991). Other studies have focused on how the Gricean maxims of the Co-operative Principle are manifested in online discourse. This includes consideration of the conversational structure of electronic discussions (Condon and Czech 1996; Herring 1999) and interaction management and modality (Davis and Brewer 1997), including the strategies used to maintain coherence in topic development (e.g. Herring 1996).

2.2.2.1 Electronic discourse as a new register

Davis and Brewer (1997:28) define a register as a variety of language; a system of linguistic expression which is governed by situational factors. Varieties are systematic and predictable and embedded within a context of use. An in-depth linguistic description of the register (language variety) of asynchronous electronic discourse is important because this will not only throw light on the situational features of the context, but also enable practitioners to develop models of effective communications.

Early attempts to describe electronic discourse referred to it as a "hybrid form" (Ferrara et al 1991, Murray 1988) which displays features typically associated with both speech and writing. Other terms coined to refer to CMC discourse include: Interactive Written Dialogue (Ferrara et al 1991), "Written Communications" (Wilkins 1991) and most recently "Netspeak" (Crystal 2001:17). All refer in some way to the notion of the high

degree of negotiation of meaning characteristic of oral conversation, combined with the physical constraints of writing text, which can result in time for reflection. The relationship of electronic discourse to spoken and written language is at the core of this description because conversation in CMC is dependent on reactions to written messages. A successful online message shows awareness of the audience and "persuades" them to continue the topic as developed by the current speaker. However, it has long been recognised (e.g. Crystal and Davy 1969, Biber 1988) that there is no absolute difference between speech and writing, and that even a continuum is an oversimplification of the way the variables intertwine (Crystal 2001: 28).

Most attempts to characterise electronic discourse as a recognisable register have been conducted using Biber's (1988) multi-dimensional-multi-feature (MD-MF model) factor analysis approach to register description (Collot and Belmore 1996, Ferrara et al 1991, Davis and Brewer 1997). The attraction of Biber's work for this purpose is that the methodology does not include a variable for mode of production, and thus frees the analyst to consider clusters of linguistic factors.

In some respects Crystal and Davy foreshadowed Biber's approach. They (1969:64) proposed the classification of texts in terms of what they called "dimensions of situational constraints", which Biber calls "components of the speech situation". Both Crystal and Davy and Biber hypothesised that differences in situational variables would correlate with particular configurations of linguistic features. Further, Biber hypothesised that sets of linguistic features consistently co-occur in groups of text, and serve to perform a specific communicative function. Biber's innovation was to use a computer-based corpus analysis to determine sets of linguistic features whose presence or absence correlates with what he calls "textual dimensions". A textual dimension is a functional categorization, which cuts across traditional genre classifications.

His research, which is based primarily on exploratory factor analysis, identified six factors and thus six dimensions. He labels each dimension in terms of the linguistic features associated with that dimension. For example one such dimension is "involved

versus informational production". A text rating high on the "involved" end would contain a relatively high proportion of private verbs (e.g. like believe, think, feel, know) contractions, first and second pronouns, pragmatic hedges (e.g. "sort of", "well, you know..."), if-clauses and emphatics. In contrast a text rating high on the "informational" end of the dimension would be characterised by use of attributive adjectives, prepositional phrases, lexical diversity and a preference for nominalization. The score of different genres on each dimension allows a comparison of genres both within and across dimensions.

Collot and Belmore (1996) used Biber's framework to analyse a corpus collected from nine different recreational conferences, containing about 200,000 words contributed by over 520 writers. They calculated the statistical measures of frequency for each of Biber's 59 features and then compared these results to Biber's analysis, in order to determine where electronic discourse fits in on each of Biber's dimensions. The results show, on this mode of analysis, that electronic discourse most closely resembles the genres of letter writing, with the full range of variation between personal and professional correspondence. A lower, but still significant, degree of match was noted with the genre of public interviews. Davis and Brewer's study of genre, which applied a similar methodology (also using Biber's MD-MF model), observed that the electronic discourse in their corpus found its closest match in the genre of professional letters in Biber's scheme. However, they conclude that the online discourse bears similarities to several of the genres analysed in Biber's original research study (Davis and Brewer 1997:28).

Collot and Belmore recognised four situational features, which affect language use in electronic discourse. These were identified as the degree of shared knowledge and common interests among participants, the purpose of the communication, the tripartite nature of the roles played by the participants, which include an addressor, an addressee and an audience[1] and the relationship of the speaker to the text. However, their results on the relationship of speaker to the text were inconclusive. Further, it might be noted that

[1] This partly explains the similarities of electronic discourse to the genre of public interviews

the first two situational features regarded as significant variables accounting for language variation are also considered significant in shaping social behaviour (see 2.2.1.2).

Nevertheless, there is evidence of the systematic influence of certain situational factors on modality shifts in electronic discourse. Davis and Brewer (1997:80-81) note the use of higher lexical diversity when participants take an intellectual or self-guarding stance in the message, in contrast to lower lexical diversity when the messages has an interactive or social focus. They also note variation in the use of modal verbs and different verbs of suasion depending on the degree of confidence the speaker chooses to express in the information content of the message.

Further, Davis and Brewer (1997:90) focus on the shift-style indicated by the use of "it-constructions", like "it seems..." "it appears...", which are consistently used in their data to achieve the dual functions of direct reference to an antecedent clause and to signal prominence to the comment. Moreover, these "it-constructions" are used for cataphoric reference, when applied to new and perhaps controversial topics. This contrasts with the more usual anaphoric reference for topic maintenance and coherence. Therefore the use of these types of "it constructions" (it appears/seems) represent markers of the writer's perception of the information content of the message, and sensitivity to the illocutionary and perlocutionary effects of this content. Use of this linguistic form is therefore a choice of an indirect expression of meaning, most probably used as a face-saving strategy.

There are some clear arguments for describing electronic discourse as a new register. However, there is still little real information on the nature of this register. On the other hand, there are some emergent patterns in the existing research with respect to the range of variation that occurs in electronic discourse. There is also notable consistency in the result that electronic discourse bears similarities to letter writing. Perhaps this is a similarity born of similar production constraints. Both are produced reflectively, outside time-processing constraints and with the orientation to dialogue with an audience.

2.2.2.2. Conversational structure

The two medium-specific situational factors that challenge the established system of turn taking which governs the conversational structure of face-to-face interactions (Sacks, Schegloff and Jefferson 1974) are that communications are asynchronous and computer-mediated. As messages are posted to the central system they are added to the central database in the order in which the computer processes them. This over-rides the context in which the writer may have contributed the message. For example, a writer A in a time zone Z, may compose a message in response to the online discussion as presented, but this message may be preceded in the transcript by one or more messages composed and sent at the same point of time, but received by the main computer earlier. This situation is particularly difficult to manage in synchronous interactions. In asynchronous interactions the temporal gaps between messages tend to be greater, allowing contributors to plan a coherent response to the messages of their choice.

Further, asynchronous communications are more likely to take advantage of the threading facilities of conferencing software. This facility allows participants to contribute a message at any stage of the transcript, by using the reply function, thus crossing time-boundaries, and creating clusters of topics in the transcript. If managed well by skilled discussants, the clusters remain tightly organized and independent of each other. However, typically replies to earlier clusters are distributed throughout the text, resulting in a confusing, non-linear, multi-topic, multi-braided transcript, where the coherence and relevance of physically adjacent messages is a matter of chance rather than design.

Crystal (2001: 148) argues that in the typical contextual conditions of asynchronous group CMC, there can be no turn taking and hence no adjacency pairs. This argument is based on the traditional view of turn taking as embodied in and inseparable from the speech acts of adjacency pairs. However, although there is no real turn taking in asynchronous electronic discourse (Davis and Brewer 1997:28), there is interactivity and continuity in the discussions (Preece 2000, Crystal 2001: 135), which is achieved solely through the contacts made with messages left on the system. Moreover, the research suggests that this interactivity is achieved mainly through adjacency pairs (Condon and

Czech 1996, Herring 1999). The issue is how users have adapted the ways they use adjacency pairs to the CMC context.

One adaptation made to the system of adjacency pairs is to explicitly create the illusion of adjacency between the second or third exchange part and earlier parts (Crystal 2001:142, Herring 1999). This can be done in a variety of ways including direct cross-reference by message title or author's name to an earlier message, or by use of quotation or paraphrase of a section of an earlier message. Repetition of titles or of key phrases is particularly prevalent (Davis and Brewer 1997:130). A second example of the adaptive use of adjacency pairs is the often-used technique of encoding an invitation to respond as the first part of an adjacency pair, typically a request for feedback or an open-ended question. This technique is a standard means to invite interactivity in the group (Salmon 2002a: 101) and it is so common that Condon and Czech (1996) were able to create a typology of adjacency pairs used in this way by online groups in decision-making tasks. Another example is the use of back-channel signals, which in CMC are verbal and explicit. For example, netiquette requires that contentful messages receive an early acknowledgment pending a reflective reply. These types of message, which can be read as a form of turn taking (Herring 1999), are very typically also adjacency pairs (Crystal 2001:143).

2.2.2.3. Cohesion and coherence

There is a clear preference for encoding some discourse management functions as first-pair parts of adjacency pairs. This provides a predictable and easily navigated framework for the conversation. However, the adjacency pair structure alone does not explain how online interlocutors manage topic development in a manner, which is sufficiently economical to remain interactive. What discourse strategies are used to achieve coherence and cohesion as the topic is developed across messages and across contributors in this non-linear communications context?

One primary means that interaction and topic coherence has been achieved is by the evolution of a basic message structure. Herring's (1996) work on the basic message schema is fundamental (see also Crystal 2001, Condon and Czech 1996, Davis and

Brewer 1997). Herring identifies the basic message schema as consisting of three functional moves; an introduction, a contentful body and a closing section. In the ideal 3-part schema the introduction makes an explicit link to an earlier messages, the body contains an expression of views on the topic or issue raised through this link and the closure makes an appeal to other participants to comment. Systematic variants on the basic schema depend on variations in the stance of the writer to the views expressed by others. The aligned variant typically expresses agreement with a previous writer, and develops the topic through expression of a non-critical view or through answering a question, making a suggestion etc., before closing with an appeal for comment. The opposed variant expresses a critical view of the topic or the interpretation of the topic and may either suggest an alternative approach or call for closure.

A second set of discourse management strategies aimed at maintaining coherence in the interaction has an "orientation" function. The purpose is to orientate the audience towards the goal of the interaction and to ensure that the schematic frames being used by the group members to accomplish the task are both appropriate and shared. Davis and Brewer (1997) identified three such strategies in their case study. The first is the (occasionally innovative and ludic) use of titles. Message titles in electronic discourse are indexical, as they set expectations about the content and discourse style of the text. Titles are also commonly used as speech acts to signal the writer's intention in the message. Thus the title is used both to attract readership (Crystal 2001:140) and to provide a permanent reminder of the message content in the transcript, which participants use as a reference point for writing their own messages. Word play in the titles can also be used to link a series of messages together (Davis and Brewer 1997:73), and tends to occur as a game, which a group develops around a theme e.g. "Sandy speaks", Connie comments", Tom's reflections". This sort of game both threads the messages together and creates a group identity. The second type of orientation strategy in Davis and Brewer's corpus is the use of rhetorical questions. They identify several different functions associated with rhetorical questions and the overwhelming principle is their use as a framing (or predictive) function to guide the reader's interpretation of the message content or to control the discourse. Over 50% of the rhetorical questions in their corpus signalled the

reader to assent or dissent with the writer's response to the question. The questions are being used, in this way, as a device to establish consensus over the common ground of shared knowledge. The third type of orientation strategy observed in the study is repetition of the macrostructure of a previous message. This involves repeating or mimicking the narrative structure and rhetorical strategies of an earlier message, but inserting one's own content. If used within the natural reading span of between five and seven messages (Davis and Brewer 1997: 131), it is quite a powerful and economical device to comment, often critically, on another writer's perspective.

A third means of maintaining cohesion in the text and thus coherence in the conversation is through creating cross-referencing and various forms of lexical link between messages. Lexical repetition is the most frequently used strategy for creating cohesion between messages (Davis and Brewer 1997, Wilkins 1991). Simple repetition is relatively unusual and the full panoply of lexical variation associated with Halliday and Hasan's term "reiteration" (Halliday and Hasan 1976: 274) is represented. This includes synonyms, hyponyms, nominalizations, super-ordinates, and antonyms. Moreover, when cohesion is achieved through reiteration this relies on presuppositions about the audience's shared cultural knowledge (Wilkins 1991:63). Quotations are also used to weave cross-links between messages. Pragmatically, quotation serves two functions in asynchronous conferencing; to re-create the frame for adjacency pairs (2.2.2.2) and to invoke previous shared knowledge (Crystal 2001:142). Lengthy quotations are extremely rare, and unnecessary as the source messages are available, and cohesion is often achieved through the re-use of salient, individual, lexical items in the body of the message. Textual links are also made between messages through anaphoric reference. Anaphoric reference is most explicit in the opening sentences of a message or in message titles (Crystal 2001: 143, Herring 1996:88). However, anaphoric references can also occur within the body of the message, and may unambiguously and explicitly refer to a referent, or be expressed indirectly through key phrases.

Summary

Although there are few available linguistic studies of electronic discourse, the findings of existing studies are consistent. Electronic discourse is a new and emergent register, governed by the situational factors created by the asynchronous and computer-mediated communications environment. Users have also adapted their discourse management strategies to this new context, most particularly in the ways in which the shared frame for the discourse is created and recreated through text and through the use of rhetorical questions and first-part adjacency pairs to control the topic development.

2.2.3. Management of Online Learner Groups.

The belief that CMC environments have the potential to provide opportunities for active engagement in productive learning discussions has long been recognised (Goodyear 2002, Harasim 1990, Hara et al 2000, Kaye 1992), and supported by research on the process and learning outcomes of online groups (Hiltz 1994, McAteer et al 2002, McConnell 2000, Steeples et al 2002). On the other hand, the effectiveness of the implementation of CMC online learning programmes is very variable. In practice, it is often the case that there are skewed participation rates (Kaye 1992, Tolmie and Boyle 2000), poor uptake and performance on online tasks (Calvani et al 1997, Hara and Kling 1999), chaining of talk with no attempt at joint topic development (Henri 1995, Tolmie and Boyle 2000), or simple two part question and answer exchanges (Steeples et al 1994, Mason 1989). As in all educational contexts, it is the management of the learning process that makes the crucial difference between poor and successful implementation.

CMC learning environments are a hybrid form of distance education and conventional learning environments. As in traditional distance education, online courses require detailed pre-planning. The design needs to provide for the provision of resources, opportunities for communication and interaction between learners and tutors, and learners and learners, learner assistance, and tasks to encourage learners to cognitively engage with the materials provided. Further, the implementation of the design requires concern with the operational management of the learning environment (e.g. Harasim 1990,

Salmon 2002a) and specifically with the provision of feedback (Laurillard 2002, Steeples et al 2002).

However, while certain factors have been identified as critical in online course design, including group organization, task type, temporal frameworks, system use and overall purpose (see Tolmie and Boyle 2000 for a review of the literature), there are clear variations in the structure and pedagogical approach taken by online course designers. This may be partly accounted for by their different motivations (Jones and Asensio 2002). Some practitioners aim to innovate with radical proposals for use of online environments (e.g. Hsu and Hiltz 1994, McConnell 2000, Goodyear 2002), others aim to refine existing practice (e.g. Mason 1992, Salmon 2002a), others aim to adapt established pedagogies to the online environment (e.g. Paulsen 1995, Pincas 1995).

In such a fluid situation, it is helpful to step back to examine frameworks proposed to represent the underlying principles of online instructional design and learning. I will discuss two frameworks, both of which are based on a large-scale research base, and are currently widely used as models for practitioners. Salmon's (2000, 2002a) model of teaching and learning online, which is based on extensive levels of data collection (Salmon 2002b: 204), is a useful generic model of the life cycle of a successfully managed online discussion group. The framework consists of five stages. The model is temporally linear and hierarchical, and describes the passage of an individual's participation in a learning group from the early stage of arriving in the online environment, through online group socialization towards joint knowledge construction and finally to closure and reflection on future learning goals. Each stage requires participants to master certain technical skills. Each stage requires different e-moderating (operational) skills to support and manage the type of interaction characteristic of that phase. Salmon also sets out programmes of different activity types for each of the five stages, providing in this way a carefully designed set of scaffolds for group management. Stages three to five, information exchange (stage 3), knowledge construction (stage 4) and development (stage 5) are the constructive and purposeful stages for learning, but depend upon socialization of the group through the two preceding stages. The motivation

to participate, arising from both extrinsic and intrinsic motivations, are critical to this process and are a key consideration for the instructional designer and the moderator (Salmon 2002a: 18).

Steeples et al (2002:331) model the context for online course design as consisting of three components; a pedagogical framework, an educational setting, in which the framework is implemented through the concrete activities, processes and artefacts used to create the learning environment, and the wider organizational context, such as a school or university, in which they both exist.

Their pedagogical framework consists of four elements:

- Philosophy
- High level pedagogy
- Pedagogical strategy
- Pedagogical tactics

The philosophy element is concerned with the educational philosophy behind the course design. This involves making explicit the conceptualisations of the processes and conditions for effective learning, which underlie the course design. The high-level pedagogy element is concerned "with the concrete instantiation of philosophical positions in creating and managing an educational setting" (Steeples et al 2002:334). At this level there are no prescriptions for action, but consideration of the types of learning activity and other practical procedures, which can be put in place to implement the chosen philosophical position. In contrast, the pedagogical strategy and tactics elements are directly concerned with action within the educational setting. These elements comprise the operational agents of the framework. Within these elements descriptions of the actions to be taken to achieve the target learning objectives are usually prescriptive.

The educational setting is represented as a set of relationships between the task, the learning environment (which the educational technology is only one part of) and the learning activity. The separation of task (the planned blueprint for the learning activity)

and learning activity (what learners actually do in response to the prescribed task) is central to this representation. Learning activity is what learners do as a result of appropriating the set task. Moreover, the benefit of learner appropriation is learner ownership of the task and thus an increase in intrinsic motivation to engage actively online. However, effective appropriation relies on the learners finding the task objectives and structure both transparent and accessible (Tolmie and Boyle 2000), which throws the onus back onto the design and operational elements of the pedagogical framework.

These frameworks help us to identify some basic principles of online course management. Firstly, there is a clear separation, both temporal and functional, between the design of an online course and the operational management (or moderation). Nevertheless, the design has to predict the ways in which learners will appropriate the tasks, in order to provide suitable and supportive infrastructures and structures within the online learning environment. Secondly, online courses are mainly designed around tasks and learning activities. Thirdly, a major concern for online course designers and moderators is stimulating and maintaining participant motivation.

It is now possible to isolate the operational management from the design stage and to represent the factors, which are regarded as critical to the process of online courses (Tolmie and Boyle 2000), in terms of the task design and the learning activity, which follows from it. The nature and process of the learning activities, which are influenced by the underlying educational design, predict and inform management decisions on five factors, as shown in Figure 2.1. The factors identified are: task purpose, the learning group, information management, time management and the design of the virtual environment.

For example, while received wisdom advocates a tutor-student ratio of 1:15 (Henri and Rigault 1996, Wells 1995), obtaining critical mass and meeting task objectives in specific contexts of practice may involve forming either much larger or smaller groups. The design of the virtual learning environment (e.g. developing different kinds of functionalities and communication spaces, and making navigation intuitive) and the

pacing of sub-activities will be determined in the same way. Failure to make these infrastructures accessible and supportive of the activities tends to lead to learner disaffection and dropout (Hara and Kling 1999).

Similarly, the purpose of the interaction follows on from the goals of the learning activity. Purpose is regarded as one of the most critical of factors in the success of online communities (Preece 2000) and online courses (Tolmie and Boyle 2000). Having a shared purpose, which is negotiated and re-negotiated throughout the duration of the groups' activity, is central to fostering ownership of the task, and thus commitment to the group and to the task objectives.

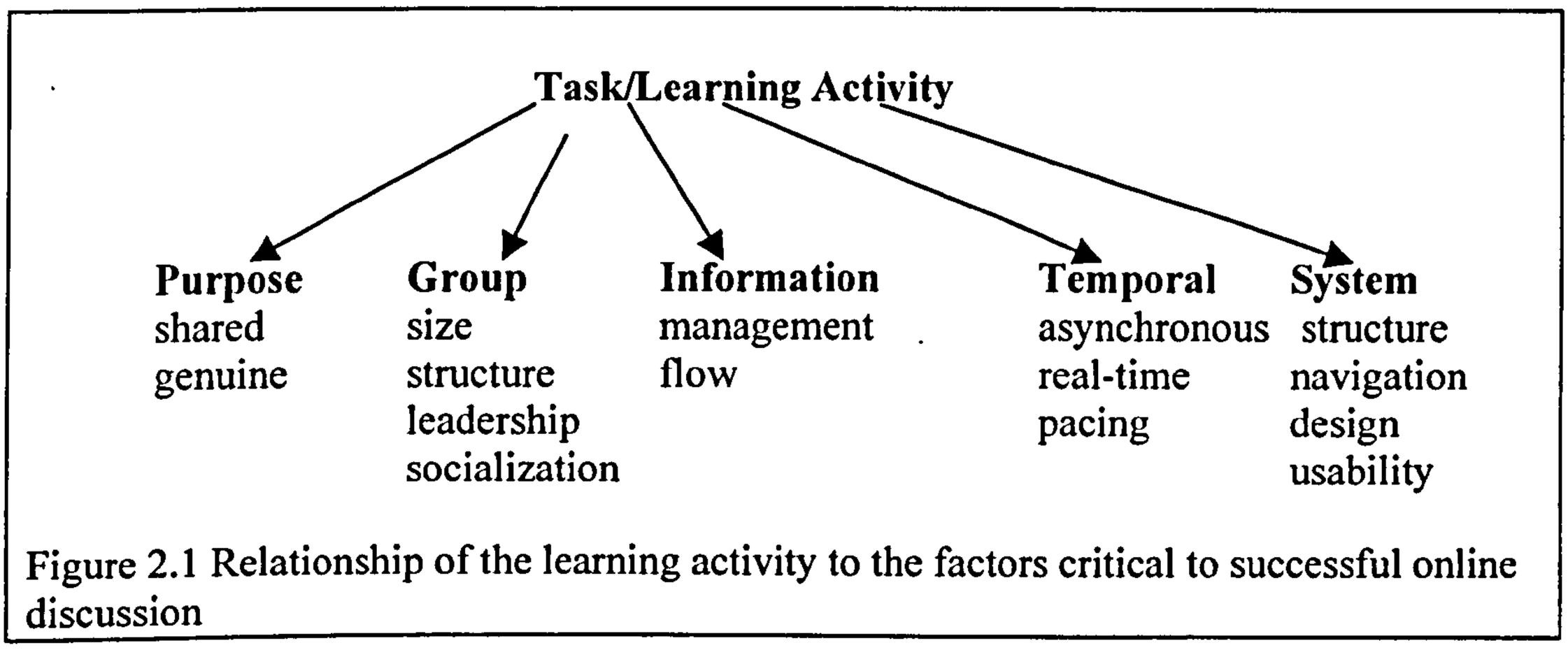


Figure 2.1 Relationship of the learning activity to the factors critical to successful online discussion

The effective management of these five factors should result in a situation online where there is an even and steady flow of information (critical mass), which can be shaped through feedback from peers and tutors (Feenburg 1989) into useful and usable information to enable the participants to achieve their learning goals. In turn, although this is somewhat of a chicken and egg conundrum, this process of presentation-feedback-reflection increases participants' intrinsic motivation to engage actively and productively online. Indeed, many course designers deliberately build in strategies to increase group interdependence and so to encourage regular peer commentary. One of the most common ways in which this is done is through designs developed under the auspices of Computer Supported Cooperative Learning (CSCL) (e.g. Ganesan et al 2002, Kaye 1992, O'Malley 1994 . See also section 2. 3).

As acknowledged, intrinsic motivation alone may not be sufficient to sustain productive group work online. The wider educational setting for the virtual learning environment, including the organizational context, the users' personal context and aims, communications with staff and learners from other sections of the organization, and, especially, assessment procedures contribute to building up extrinsic motivation.

Many online assessment models draw on the procedures proposed for more traditional forms of co-operative learning. There are two reasons for this. Assessment procedures and tasks clarify the intended learning goals and outcomes, which can become confused, as the learning activity takes on a life of its own. Assessment procedures can be also used to reward participants for working closely together online (McConnell 2000:228). This typically means grading some aspect of the online participation that has involved co-operative group work.

Moreover, while this might appear a position of expediency, designed to stimulate motivation and purpose, there is a pressure on universities and other educational institutions to offer more flexible and participative instructional programmes and assessment models (Trehan and Reynolds 2002) to support lifelong learning and, especially, to meet the demand for courses that can be related directly to professional and occupational practice. New paradigms of learning modes have emerged to fit these demands, including learning communities (Fox 2002) and self-directed open learning at a distance, such as developed under the European-funded JITOl project (McConnell 2000:198). Traditional modes of assessment have come under attack as fundamentally contradictory to the aims of learner development through active and conscious participation in the learning process, which are the philosophical underpinnings of these types of programmes (Rowntree 1987). Indeed, in many open learning programmes, where the emphasis is on professional development, consciousness-raising, and reflexivity collaborative forms of assessment might seem pre-requisite (Trehan and Reynolds 2002:234).

Nevertheless, while the arguments for increased engagement and consultative approaches are powerful, and there is a concern to acknowledge and reward constructive online learning activity, there are practical issues in the grading of online participation that need to be considered. Firstly, grading schemes that implicitly reward the amount of online participation, for example through grading the overall contribution to the task, fail to take account of the fundamental inequality in access to online courses. Some course participants may have funded, unlimited access while others are hindered by financial constraints, or poor access to the networks. Nor does this approach sufficiently value the potential benefits of vicarious learning (learning by observing and listening to others) (Mayes et al 2002). Grading of online participation might therefore proceed on the basis of sampling of contributions. Secondly, variations in online literacy and competence (section 2.2.1.2), and the possibility of using ghost-writers raises concerns over assessing skill in communicating online as opposed to assessing subject knowledge and understanding. Thirdly, awarding a group grade for a joint task performed online may benefit poorly motivated participants more than their harder-working colleagues, referred to as the free-rider effect (Slavin 1995).

In practice there are five established modes of assessment used for cooperative learning (Salvin 1995). Any of them are equally suitable for formative and summative purposes and all are easily adapted for use with online learning groups. The five assessment modes are: individual, group, peer, triangulated and transcript-based.

Assessment of individual performance has traditionally been the most prevalent mode in the UK. In CMC-based, award-bearing courses assessment of the individual's learning can follow the traditional procedures of a final report, essay or formal examination that is prepared and submitted off-line. A newer alternative is to formally integrate the online work with assessment procedures and criteria through continuous assessment tasks based on the learning activities of the online group.

Assessment resulting in a group grade is most prevalent in traditional cooperative learning models (section 2.3). Frequently, this involves some form of competition

between groups to enhance motivation (Slavin 1995). Hsu and Hiltz (1994) implemented these principles in the assessment design for a Masters in Management. The assessment was based on the performance of small groups of 3-4 students on a business simulation game. During the game the groups competed against each other and against three virtual companies operated by the computer, comparing performance levels at regular intervals. Summative assessment was made on the basis of a final group report that was evaluated by a panel of external experts on criteria related to actual business practice.

Peer assessment most commonly forms a part of formative procedures; and usually occurs naturally as part of the process of negotiating a common approach to the task, as this involves assertion, challenge, hypothesis-formation, explanation and counter-challenge. But McConnell's (2000)[2] triangulated assessment design makes peer assessment a central part of the formal procedure. In McConnell's design the formal assessment of individual coursework is done within working groups of 3-4, including a tutor. The groups are specifically set up to provide mutual emotional and academic support as the coursework is being written. Once the coursework is submitted the peer group takes over the task of assessment. The assessment is made jointly by the writer, a peer learner and the tutor according to criteria selected by the writer but approved by the learning group.

McConnell's design is based upon an understanding of cooperative learning as reciprocal action and dialogue among a community of learners. The design also proceeds on the basis that the learners are self-selecting and self-managed. The presence of the tutor in the assessment triangle and obedience to standard university procedures for assessment are intended to address issues of credibility. However, McConnell (1994:128) recognises the process of a triangulated self/peer/tutor assessment mode can put considerable emotional strain on the participants, which in itself challenges objectivity (Trehan and Reynolds 2002). Moreover, Hardy (2002) discusses two paradoxes collaborative assessment raises for tutors. The first paradox is that of working democratically while simultaneously being responsible for upholding the accepted standards of the university.

[2] See also Trehan and Reynolds 2002 for a review of this procedure.

The second is the paradox of participating in the process of evaluating and grading participants' work in a context where the tutor's expected role is to provide non-judgemental support.

Transcript-based assessment, which is the fifth mode of assessment, is derived from methodologies for the evaluation of computer conferences. For evaluation purposes content analysis, or categorisation of message types, can be used to map the patterns of interaction in the conference, the development of the topic and the roles being played by participants. Mason (1992: 115) proposes that sets of messages can be evaluated according to criteria derived from modelling behaviours which display the attributes of critical thinking, deep level understanding and cooperative group action. As this is the subject of this thesis, this chapter includes a review of the main frameworks used for content analysis of CMC and CSCL transcripts (section 2.4). However, the argument of the review, and of this thesis, is that most of these schemes are flawed, because in practice it has proved difficult to derive reliable indicators for the target behaviours that can be established on the basis of asynchronous CMC interaction alone.

Summary

The argument of this section is that CMC does represent a new social and communications context. Developing and maintaining a social and personal identity in the online environment relies partly on acquiring skill in online literacy. While there are different aspects to online literacy, including straightforward writing skill, there is evidence that electronic discourse is a new register, which is yet to be fully analysed and described.

Moreover, the maintenance of online groups depends upon participants having a shared purpose, and frequency and consistency of interaction. In the context of online learning on HE award-bearing courses, levels of participation and motivation need to be maintained at a continuously high level. The academic quality of discussion also needs to meet the required standard for the course. Online educational groups are therefore managed through the dual actions of educational design and process management.

Feedback, from tutors and peers, and task designs, which increase levels of group interdependence, are also seen to be crucial factors in maintaining a critical mass and quality of discussion. Many online instructional programmes have borrowed techniques from co-operative and collaborative learning paradigms to achieve these objectives. The subject of the next section is therefore a review of approaches to co-operative and collaborative learning and a discussion of the models of deep-level learning developed by the school of conversational theories of learning.

2.3. CO-OPERATIVE AND COLLABORATIVE LEARNING

Co-operative and collaborative approaches are one means of addressing the issues of critical mass, motivation and academic quality in online courses. Moreover, there are not only established sets of practice for co-operative and collaborative learning that can be easily adapted for use online, but also a small, but significant, body of literature which attempts to explain and model how people learn through co-operative group interaction.

The review in this section is organized into two parts. The first (section 2.3.1) considers the leading accounts of the procedures and mechanisms of co-operative and collaborative group learning. The second (section 2.3.2) reviews and discusses Laurillard's (2002) conversational framework as a model of deep-level learning, with specific reference to her use of the research methodology of phenomenology (Marton and Saljo 1976a, 1976b). The argument is made for using Laurillard's approach as the working theory for the educational design aspects of this thesis.

The terms co-operative and collaborative learning are used to refer to a wide range of teaching strategies that share the provision of opportunities for students to work together in small groups. There is considerable overlap between these terms, and there is no significant distinction to be made at the level of methodology. Both approaches involve two or more individuals in a situation where they have to reach a common goal and maintain some agreement, or at least some mutual understanding, in order to accomplish

their joint problem-solving task. However, the approaches should be distinguished by the degree of mutual knowledge partners need to establish to complete their task (Crook 1994, Schrage 1993). Therefore, in this work the terms are used in parallel with reference to methodology, thus marking derivations of the term "collaboration" as referring specifically to this condition of jointly developed, shared knowledge.

2.3.1. Models of Co-operative and Collaborative Learning

In co-operative learning group work is organized to achieve two main instructional purposes. The first is to provide enhanced learning opportunities through discussion around joint problem-solving activities. The second is to promote reciprocal activities that support learning, such as peer tutoring and peer modelling of target behaviours. The outcome of the cooperation is an outcome that could not have been achieved by individual action alone (Dillenbourg 1999, Hiltz 1994, Kaye 1992, McConnell 2000), whether measured in terms of learning gains on assessment tasks (Slavin 1995) or in terms of outcomes that are the direct product of joint decision-making (e.g. Hsu and Hiltz 1994).

Within this general definition there are a wide range of co-operative approaches. Co-operative learning methods may be informal, as when an informal, learning-support group forms, or highly structured involving specific ways of structuring groups, their tasks and the assessment. Co-operative groups may work on fairly open-ended tasks, or they may work together through structured activities to master a specific academic content. Co-operative groups can be organized around functional roles, task specialisation roles (where each member takes responsibility for a different aspect of the task) or around whole group activities. Further, groups may co-operate to acquire different kinds of knowledge (Goodyear 2002). For example the co-operation may occur within an academic or professional development project, or support the exchange of practical information for situational dependent problem solving, or provide support and counselling in self-development basic skills programmes. The co-operative relationship may be long standing or a short-term, instrumental interaction.

In an attempt to draw together the main principles of co-operative learning models, we can treat the various approaches as emerging from two schools of thought. However, these schools of thought are not in opposition to each other and although they represent different approaches to the implementation of co-operative learning, they share in common certain beliefs about the objectives and motivational, cognitive and social benefits of the approach. In the USA and in Israel, where the co-operative learning movement is an established part of compulsory education, it has become curriculum-based (McConnell 2000:16, Slavin 1995). One alternative approach, especially prevalent in adult and higher education in the UK, has developed around the "constructivist" model of learning represented for example in the application of Lave and Wenger's (1991) ideas on situated learning (Brown et al 1989), in the development of communities of practice and learning communities (Goodyear 2002:56) and in the design of Lancaster University's MA in Management learning (MAML) (Trehan and Reynolds 2002). These approaches are also heavily influenced by the dominance of socio-cultural and cognitive conflict theories in the field of learning psychology (Crook 1994, Dillenbourg 1999).

2.3.1.1 Curriculum-based models

Two schools of thought dominate approaches to co-operative learning in the USA, the team learning approach and the "Learning Together" model.

The Student Team Learning approach (Slavin 1995) emphasises team goals and team rewards that can only be achieved if all members of the team achieve their individual learning objectives. The core model is a heterogeneous group of four members working on a common curriculum, each at their individual level. The learning objectives for each level are set by the instructor, and achievement is assessed on an individual basis through quizzes, standard tests or inter-group competitions. Direct instruction is offered by the tutor, but most tutoring in the application phase is conducted within the peer group, and peers are responsible for assessing each other's work. Team rewards are awarded in the form of group certificates, privileges in school or advancement in an inter-group league table if the sum of individual achievements in each team meets or exceeds their learning targets. The approach emphasises group interdependence and individual accountability at

the same time, stressing the importance of group rewards as a reason to take responsibility for one's own and others' achievement.

The "Learning Together" model (Johnson and Johnson 1994) is the other dominant approach in the USA. This model shares many of the organizational features of Slavin's Student Team Learning model but differs in the respect that social cohesion and team building are emphasised as an alternative motivating force to individual accountability and competitive reward structures. Assessment is based mainly on group performance and considerable attention is paid to pre-course team building activities and training in group management strategies.

A third approach, recognised within the US scheme (Slavin 1995) is the Group Investigation model (Sharan and Schachar 1988, Sharan 1990). The Group Investigation model prescribes task specification, with each individual group member taking responsibility for one aspect of the task. The individual then tutors the group in their area of specialisation and the divergent parts are combined through discussion and negotiation to form a convergent understanding of the whole project. The model addresses issues of individual accountability without the social implications of engaging in competition. However, the main criticism of this model is that in practice it leads to unequal levels of knowledge and understanding across the different aspects of the task. While research on the Group Investigation model has generally supported its overall effectiveness (Sharan et al 1984, Sharan and Schachar 1988), it is important to note that the 1988 study (which indicated significant improvement results) included unique characteristics. In particular, the Group Investigation teachers and participants received extensive pre-training and follow-up before the study began (Slavin 1995:17). Earlier studies, which failed to provide such extraordinary preparation, reported consistently lower attainment outcomes (Sharan et al 1984).

These prescriptive, curriculum-based models of co-operative learning are influential but represent only one approach to co-operative and collaborative learning. Other leading

approaches include situated learning, communities of practice and the CSCL model developed within Lancaster University's MAML.

2.3.1.2 Constructivist models

The notion of situated learning and situated cognition (Brown et al 1989, Lave and Wenger 1991) is a simple idea, rooted in the analysis of naturally occurring learning. Nor is it a particularly new idea. The notion of learning new skills and gaining new insights through a process of problem solving within specific contexts of usage had been with us long before Plato penned his dialogues on the topic.

However, as a school of thought, situated learning progresses beyond the simple analysis of natural learning as it is embedded within a theory of the nature of knowledge that is influenced by Vygotsky's work on learning and culture. This view rejects the idea that knowledge is an abstract entity that can be parcelled up as information packets to be exchanged and acquired or discarded. Instead, knowledge is viewed as embedded within the cultural artefacts and social practices, and institutions, which make up a society or cultural group. Thus the socio-cultural theory of knowledge is that learning is a process of interacting with these cultural artefacts and with communities of practitioners in order to internalise the accumulated knowledge and insights of one's socio-cultural group. For example, the way food is prepared, served and eaten tends to reflect specific abstract (often religious) cultural beliefs and social practices, and to reflect culturally specific accumulated knowledge about mixing ingredients and modes of preparation. Further, language is one of the key mediating tools humans use to access their environment and to acquire knowledge.

This view of knowledge naturally leads to the characterisation of learning as a process of enculturation. Learning involves acquiring the practices and cultural perspectives of a specific group, and as such requires the learner to engage in authentic activities, which will immerse him/her in their practices. This gives rise to a range of co-operative and democratic organizational models for learning like cognitive apprenticeships, communities of practice (Lave and Wenger 1991) and learner communities.

Situated cognition and therefore situated learning are very attractive ideas. Moreover, there are now numerous well-documented accounts of communities of practice, concerning both professional and leisure activities, on the Internet (e.g. Preece 2000). These online communities are able to disseminate examples of good practice and to develop new approaches to problem-solution by pooling their resources and expertise. Moreover, the incumbents of the roles of leaders and members of the community can change in flexible ways, just like any other type of local community.

However, not all learning is necessarily situated learning. Laurillard (2002: 16-19) (section 2.3.2) offers a clear and quite succinct critique of the claim that all learning is situated. In summary, situated learning fails to account for the process of abstraction through which a student will arrive at generalisable principles, which have explanatory power for a range of seemingly dissimilar situations. Moreover, this level of principle is a level of abstract representation. At this level descriptions are articulated about how and why a phenomenon occurs as it does. It is a level of modelling that seeks to map the relationship of concepts in order to achieve explanatory power. This is Laurillard's "second-order" or academic learning, which deals with the manipulation of symbols and concepts and not with the direct input of the senses.

2.3.1.3 University of Lancaster's MAML course

Another constructivist CSCL model to be considered is Lancaster University's MAML course. This course is concerned with the acquisition and development of academic knowledge as applied to professional, work-based contexts. The assessment mode has already been considered in 2.2.3. In this section, it is relevant to describe more comprehensively the structure and design of the co-operative component (McConnell 2000:151-185, Trehan and Reynolds 2002).

This is a part-time, post-graduate course in Business Management. The MA is taught mainly online for two years, and is supported by several residential workshops. The online environment consists of a number of parallel conferences, including subject

content input areas, discussion areas, resources areas, and the learning sets, where the co-operative learning element of the course takes place. Participants submit five assignments over the two years. The assignments are designed, written and assessed within the context of the co-operative learning set. The sets are formed through collective discussion and decision-making at residential workshops prior to working online. Online the sets agree on procedures and practices to support each other in writing the assignment, through giving feedback on peer drafts, mutually agreeing criteria for assessment and finally participating in a triangulated marking procedure (self/peer/tutor). The sets are self-managed. The tutor's role in the set is to encourage self-reflection and to support the learners in taking responsibility for assessing and marking each other's work.

However, although some participants on the MAML course report significant learning and motivational gains (McConnell 2000: 181), others (as discussed in section 2.2.3.) questioned the validity of a peer assessment model that does not create an open, democratic environment, but simply creates different relationships of power than found in more traditional assessment models (Trehan and Reynolds 2002). Moreover, like Hodgson (2002), McConnell (2000:174) considers the role of the lecturer as tutor-participant paradoxical, in the respect that the tutor has the power and the responsibility to maintain academic standards, whilst not directly exercising this power.

2.3.1.4 Co-operative learning and cognitive theory

As these examples of learning models and procedures show, the term "co-operative learning" is used to refer to a variety of diverse activities, and may be used with different meanings and for different purposes in different contexts. Nevertheless, there are common threads in the underlying pedagogical principles and in the cognitive theories that inform these approaches. McConnell offers a useful summary of five common pedagogical principles:

"In summary we can say that co-operative learning:

- helps clarify ideas and concepts through discussion
- develops critical thinking

- provides opportunities for learners to share information and ideas
- develops communication skills
- provides a context where the learners can take control of their own learning in a social context
- provides validation of individuals' ideas and ways of thinking through conversation (verbalising), multiple perspectives (cognitive restructuring), and argument (conflict resolution)."

McConnell (2002:26)

Dillenbourg (1999) offers an account of how collaboration can support learning processes from a cognitive psychology perspective. He models the connection between a collaborative learning situation and the target learning outcomes as a series of indirect links. The learning situation (typically collaborative problem-solving) is designed to promote interactions between learners. In turn, these task-based interactions trigger certain cognitive mechanisms, which lead to cognitive effects, i.e. the learning outcome. The links are indirect as the intervening variables (the interactions and the cognitive mechanisms) may not occur, or may not be realized other than superficially.

Dillenbourg suggests a number of cognitive mechanisms, which include:

- *Conflict or disagreement.* This refers to the situation where diverging viewpoints lead to verbal interaction in order to resolve a conflict of views. The stronger Piagetian view is that learning occurs through the conflict between the individual's ideas and those being presented. An alternative interpretation is that the verbal interaction promoted by the presentation of alternative points of view leads to learning (Goodyear 2002).
- *(Self-) explanation.* This refers to the act of explaining one's ideas and understanding to others. It is the process of articulation, which can have learning benefits for the speaker, as well as the hearer. In academic contexts explanations require an elaboration of the topic and justification of the claims made (Chi and Bassock 1989, Chi, Bassock, Lewis, Reimann and Glaser 1989, van Lehn, Bull and Kowalski 1990). Explanation is often linked with Vygotsky's model of the

Zone of Proximal Development (ZPD), where pair tutoring by a more able peer extends the capacity of the learner.

- *Internalization.* This cognitive mechanism is the learning process of progressively integrating the ideas under discussion within one's own reasoning and internal representations of a concept. It derives from Piaget's process of accommodation, and Vygotsky's representation of the Zone of Proximal Development.
- *Appropriation.* Dillenbourg's use of the term appropriation refers to the learning benefits obtained by encountering others' interpretations of our ideas.
- *Shared cognitive load.* This is the principle that can be idiomatically expressed as "two heads are better than one".
- *Mutual regulation.* This occurs as a natural part of group work when group members justify their actions and approach to each other. This is a central part of collaborative group work where the group needs to reach consensus to take joint action on a single problem-solving task.

Summary

There is considerable diversity in the application of co-operative and collaborative approaches to learning for different purposes, contexts and learning outcomes. A wide range of learning situations are used to support co-operative and collaborative group work. However, irrespective of context, learner co-operation depends on the motivation of the participants. There needs to be both group interdependence and a strong commitment to the task, whether this arises from social bonding or a design factor of the learning situation. Successful co-operative learning supports vibrant verbal interactions and triggers deep-level cognitive processing of the learning task. The next section gives an account of deep-level learning and offers a rationale for adopting Laurillard's conversational framework as a pedagogical framework, which can be used to design the co-operative learning situation.

2.3.2. A Conversational Approach to Learning and Teaching

Dillenbourg's cognitive framework provides a structure within which we can explain and describe the mechanisms, which account for knowledge acquisition through co-operative and collaborative learning activities. Thus, he argued that cognitive restructuring occurs through processes of conflict, co-construction of knowledge, accommodation and assimilation that are supported and stimulated by co-operative learning. It was also argued that learning through conversation with others takes place through the acts of articulation of concepts, elaboration and challenge, which in themselves lead to an internal restructuring of concepts.

However, while this level of description explains how and why knowledge acquisition can take place, it does not provide a pedagogical framework in which to model the implementation. In terms of the framework proposed by Steeples et al (2002) (section 2.2.3), cognitive psychology gives the philosophical underpinning of CSCL while the variety of co-operative learning models discussed in 2.3.1 represent different approaches at the level of pedagogical strategy and tactics. This section seeks to provide the rationale for adapting Laurillard's (1993, 2002) conversational framework of learning at the interim level of higher-level pedagogy, which mediates between pedagogical approaches to practice and cognitive theory. Following this argument, the principles of Laurillard's framework are used in this thesis as the working theory to inform the design of the co-operative learning activities (section 5.2.2), from which the data for the research is drawn.

Laurillard's framework draws upon a group of empirically backed theories, here referred to as the conversational models of learning, which represent a continuous research tradition rather than alternative models. This tradition began in Pask's (1976a, 1976b) development of the very earliest of computer-based learning systems that culminated in his conversation theory. It has been developed in the comprehensive research of Marton and Saljo (1976) and Marton and Booth (1997), and most recently in Laurillard's work (2002). This school of thought has developed a specific philosophy with regard to the nature and process of deep-level learning, and a specific research methodology. The aim

of this section is to discuss the philosophy of the conversational models of learning and to review Laurillard's model.

2.3.2.1. Epistemology

The focus of this research tradition is to investigate learning processes on complex tasks, and specifically complex learning material, with the aim of generating more effective ways of teaching. These conversational models are all based upon an epistemology that rejects the idea that general cognitive principles can be identified which can be applied to all learning situations and tasks. Nor does their epistemology allow the notion that a subject area can be so well documented that the research task is to identify how best to present the material.

The epistemology is based in a number of postulates that are now regarded as well founded. Knowledge is not an entity that can exist in the mind of the knower and in an objective external world. Not all knowledge is propositional. Instead, following Piaget, Vygotsky (1962), Luria (1961), Bruner (1996) and Bartlett's (1932) work on memory, the acquisition and application of knowledge is seen as irrevocably situated within contexts of use. Knowledge is therefore relational. Moreover, knowledge is understood as occurring in a range of manifestations.

The conversational models of learning make particular use of three standard distinctions, which describe six different knowledge types: procedural/declarative knowledge, explicit/implicit knowledge, experiential/academic knowledge. Declarative knowledge is expository knowledge. It is articulated knowledge. It is knowledge that builds descriptions of concepts and the relations between concepts and topics. It includes knowledge of symbolic representations and the systems they form. Procedural knowledge, on the other hand, is the ability to carry out operations on objects. Like a skill, procedural knowledge relies upon applying rules, methods, and techniques to act upon the world and to complete tasks.

Explicit knowledge has been defined in a number of different ways. One useful, general definition refers to explicit knowledge as knowledge that is available to the knower as a conscious representation (Ellis 1994). Implicit knowledge in contrast is intuitive, automatic and unavailable for conscious manipulation. Two kinds of implicit knowledge are generally recognised; formulaic knowledge and rule-based knowledge.

Laurillard's distinction between experiential knowledge and academic knowledge is similar to Vygotsky's distinction between 'spontaneous concepts', learned in everyday life and founded in concrete experiences and 'scientific concepts' which are abstract concepts learned in the context of formal instructional settings through analytical procedures. Spontaneous, or everyday, concepts are learned through direct experience of the world. Scientific concepts on the other hand are descriptions of the world that do not necessarily match our everyday experience of the same phenomena and require a change of perspective. These concepts can only be learned through mediating tools, such as models, diagrams, verbal or textual descriptions; and entail coming to understand another person's mental representation of an idea.

Within this general epistemological framework two principles are highly developed in the conversational models of learning. The first is the principle of grounded cognition and learning. Grounded in this usage has two meanings. One is that neither the outcome nor process of a learning task can be separated from the particular context in which it occurs (Laurillard 2002), since the context usually influences the learner's perception of the task and as a result the types of learning process engaged in (Marton and Saljo 1976). The second principle is that the learning process cannot be separated from the content of what is being learned. This principle marks the deviation from a belief in the explanatory power of general principles of learning.

2.3.2.2. Research methodology

Underlying this epistemology, and a central principle of Laurillard's model, is the research methodology of phenomenography. This methodology, which is based on

conversational principles of mutual understanding, was developed (Marton and Saljo 1976) to facilitate qualitative investigation of student approaches to learning.

Phenomenography is an exploratory method that aims to investigate learning on the basis of students' descriptions of the phenomena they are studying[3]. It is thus in contrast with studies that set out to explain behaviour in terms of pre-defined characteristics. The methodology is to survey or interview a sample of students working on a genuine task, preferably one that occurs as part of the normal programme of study. Interviews and surveys focus on gaining information on the students' perceptions of the task, their internal representation of the content of the learning material, their approach to the task and the rationale for their learning and problem-solving strategies. Researchers then use content analysis techniques to examine the data and to identify common patterns. This provides a characterisation of the learning process within a context, which can be applicable to other similar contexts (Laurillard 2002:29).

Three arguments can be made in support of the principle of content-based learning. Firstly, there are qualitative differences in how students comprehend ideas and principles (Marton and Saljo 1976) and the learning strategies they use (Pask 1976a, Marton and Saljo 1976) that can only be investigated if the content of the learning is held constant. Using the same learning material is prerequisite to understanding how individual meanings are attached. Secondly, the way in which an abstract description of a concept interacts with a related everyday concept varies with the content. Moreover, the means of constructing and explaining the description in instructional settings depends partly on this interaction and partly on the structural complexity of the abstract concept itself (Laurillard 2002). Thirdly, each concept consists of a complex network of connections between propositions, procedures and cognitive operations. Pask (1976a) argues that understanding a concept entails understanding and being able to reconstruct all these links and relationships.

---

[3] Phenomengraphy is widely used as a research methodology for describing and developing teaching and learning strategies among different populations (e.g. Marton and Booth 1997, Jones and Asensio 2002).

2.3.2.3 Deep-level learning

Since the conversational models define a particular epistemology, the nature of understanding and the process of coming to know something are also explained in rather specific terms. Of the two earlier schools of thought Pask offers the more internally complex definition of the term "understanding". The criterion developed by Marton and Saljo consists of a dichotomy that is not necessarily less comprehensive in practice, despite the surface simplicity. Both influences are embedded within Laurillard's conversational framework. The core principle is the idea that understanding entails correctly interpreting in context the formal relations between different propositions that make up a topic, like a social theory or a law of physics, and demonstrating the capacity to apply this understanding in practice.

Pask (1976a, 1976b) defines a concept of a topic as a way of satisfying all the relations between propositions that are embedded within that topic. Learning is seen as developing an understanding of these relations through negotiation between conversational partners. However, true understanding of a concept relies upon the ability to accurately reconstruct it ab initio. Pask, therefore, argues that understanding can only be demonstrated through situated action, such as modelling the topic or concept, or applying theory to practice in genuine tasks.

Marton and Saljo's distinction between deep-level and surface-level processing develops Pask's definition of deep-level learning. The dichotomy is far reaching and within the research methodology of phenomenography, is used to generate multiple levels, representing a continuum between the two processing strategies. The basic criterion for deep-level processing on text-comprehension exercises is correctly interpreting the author's intention, and thus demonstrating the ability to interpret the network of propositions presented and to navigate and interpret the embedded structure characteristic of academic texts. Surface-level processing on the other hand is identified as recall of general statements made within the text, often with the effect of distorting the author's argument and intention. These criteria match well with Pask's more complex definition,

given that any representation of a network of propositions comprising even a well-established topic is subject to a number of interpretations (Pask 1976a).

Laurillard's work (1993, 2002) combines insights from both schools. She identifies five mathemagenic activities, which together form an essential part of the learning process. In keeping with her characterisation of academic learning as a second-order experience of the world, the mathemagenic activities she describes are cognitive activities encouraged by the design and goal of the learning task; but also dependent upon other variables such as the nature of tutor intervention, the learner's perception of the task and their previous educational experience and training.

Each of the five mathemagenic activities presupposes and is presupposed by the other. Each combines content and action:

- Apprehending structure
- Integrating parts
- Acting on the world
- Using feedback
- Reflecting on goals

Apprehending structure means that the learner is able to correctly interpret the underlying structure of a complex discourse of words, text, diagrams, symbols and charts that typically make up an academic learning session. Since structure imparts meaning, achieving deep-level processing in Marton and Saljo's sense entails having apprehended the implicit structure of the discourse. Integrating parts refers to the ability to map sign/signifier relations and to present a discourse as an integrative whole through different forms of representation. Acting on the world is learning to relate theory and practice. Using feedback refers to the capacity to discern and extract relevant information given in intrinsic and extrinsic feedback to adjust one's actions to fit the task goals. Lastly, the way in which the goal of a specific learning task is perceived directs learner's intentions with respect to the task, and thus the process and outcome (Marton and Saljo 1976b). Reflection on the goal therefore refers to a process of negotiation between the

person who sets the goal (usually the tutor) and the other participants in the learning task to ensure a mutual interpretation of the goal and a common agreement on the means to approach the task.

Laurillard's list of five mathemagenic activities is the most complete expression of the ideas and principles formulated by the school of the conversational theory of learning. It also comprises one possible criterion for generating an effective teaching strategy, which is theoretically and empirically grounded. This set of cognitive activities can therefore be acceptable as a description of the goal of teaching, whether the input to the instructional and learning process is retained solely in the hands of the tutor or distributed between tutor and peer learners, as is the case in cooperative and collaborative learning contexts. Laurillard's group of mathemagenic activities can therefore be read as providing information on the goals and content of the talk which are so often loosely described within the collaborative and cooperative learning theories as "discussion", "negotiation", or "interaction".

2.3.2.4. Conversation, phenomenography and feedback

The function and focus of feedback is a central principle of the conversational theory of leaning that directly informs the content and purpose of the different forms of peer talk in cooperative and collaborative learning. In all the models reaching agreement on the nature of a concept through discussion with other participants is seen as a necessary condition of learning. This underlying principle is derived from the Vygotskyan and Piagetian view of cognitive development as a fundamentally social activity.

Pask and Laurillard share a common approach to the role and nature of feedback. Talk is conducted around a description of the subject matter in combination with reflection on the application of theory in practice, and preferably within the context of some mutually accessible object, such as a simulation exercise (Hsu and Hiltz 1994), audio -visual recordings or situated activities. The conversations conducted within these types of contexts reveal differences in ways of conceptualising the topic and differences in approach to the task. These conversations are phenomenographic. They provide the tutor

or the peer group with the information to map a means of realignment to the target conceptualisation. It follows that dialogue (between two) or conversation (between multiple participants) should be continuous and should involve regular checks, through for example summaries or weaving messages, of the current state of play and understanding. With reference to Dillenbourg's model (section 2.3.1.4), this would involve representing and subsequently resolving diversity through giving explanations, mutual regulation, appropriation and finally internalisation.

Summary

Through taking a philosophical perspective on Laurillard's conversational model of learning, it is argued that this school of thought provides a systematic account of deep-level learning, which can be implemented through tasks that involve the five mathemagenic activities. Further, the emphasis on the role of feedback in learning combined with the methodology of phenomenology provide a solid justification for designing a learning situation in which learners are encouraged to adopt a cyclical approach to their understanding of the subject material. Finally, it is argued that adapting this framework to inform the design of the co-operative learning situation, and specifically the co-operative task, can trigger the cognitive mechanisms that Dillenbourg identifies as effective outcomes of group learning.

2.4. FRAMEWORKS FOR CONTENT ANALYSIS OF CMC

CMC interaction is automatically stored as electronic text, and as such provides a ready-made and textually accurate transcript of the interaction that can be analysed. Nevertheless, analysis of talk in CMC groups has attracted little attention from linguists, and few of the content analysis frameworks that have been developed are systematically based in linguistic theory. Instead, the aims of many of the qualitative analyses of CMC talk are exploratory in nature, providing a range of different content analysis frameworks which have been developed as research tools to evaluate the nature and quality of participant postings in online courses. Further, many of these schemes are time-consuming to implement, context-specific and difficult to replicate (Hara et al 2000). In

my opinion it is therefore still premature to go beyond the research phase of constructing effective content analysis frameworks, which can then be developed for use by teachers as evaluation tools.

The research for this thesis uncovered a plethora of material discussing content and interaction analysis of CMC talk in general terms. To focus the search and to identify papers of relevance and quality, the selection of frameworks for discussion in this section is made according to four criteria:

- the framework is specifically designed for the analysis of learner discourse on collaborative tasks.
- where a unit of analysis is specified, it is appropriate to an analysis of interaction in contrast to grammatical or syntactic analysis.
- the framework has been subjected to peer review through publication in a quality journal or as a book.
- the work has been cited by a number of independent authors; and therefore is evaluated as contributing to the body of knowledge on this topic.

These criteria select the five working frameworks considered in this section: (1) Henri (1992) (2) Mercer (1995, 2000) (3) Pilkington's DISCOUNT scheme (1999) (4) Howell-Richardson and Mellar (1996) (a working paper in preparation of this thesis) (5) Newman et al (1995). Of these, Mercer's work is concerned with the analysis of real-time collaborative talk *around* a computer-based problem and Pilkington's scheme is mainly concerned with marking representational levels of discourse for the generation of dialogue in computer-based tutoring systems. Nevertheless, all offer a methodology for discourse analysis of collaborative problem solving in a situation where the computer plays a significant mediating role.

Discussion of the work of these groups is organized as two strands, determined by the extent of the research base underlying the construction of the framework. The first three working schemes listed have been the object of more than one research study and have been subject to internal review and revisions. The remaining two frameworks are

working papers arising from specific case studies. The review will be addressed in this order.

2.4.1. Henri: Content Analysis Framework

Henri (1992) designed one of the first comprehensive frameworks for the analysis of interaction in CMC learning groups. Her work was ground breaking, not only in that this was the first attempt at a theoretically-driven content analysis of CMC discourse, but also in the relevance of the selection of content levels for an analysis pertaining to learning groups. Specifically, the model includes dimensions for the analysis of cognitive and meta-cognitive strategies. Moreover, this early framework has undergone revision (Henri and Rigault 1996) and review by an independent research group (Hara et al 2000).

The dimensions of Henri's framework are generated from a number of diverse theoretical models. The dimensions of the first level are defined with reference to earlier established models of CMC pedagogical practice (Harasim 1989, 1990, Hiltz 1986, 1990, Mason and Kaye 1989). Three broad levels of content (Henri 1992:123-124) are identified:

- What is said on the subject (propositional content)
- How it is said (participative, social and interactive elements)
- Processes and strategies (tangible strategies used by learners to process the learning material)

Unusually, Henri chooses to disregard the propositional level in both versions of the framework and builds the framework on what she perceives as generalisable aspects of a learning interaction: i.e. the social/interactive and process dimensions. From these two levels she generates five dimensions that form the analytic framework: participative, interactive, social, cognitive and meta-cognitive. She provides working definitions and typical indicators for each dimension on a very broad and eclectic range of theories, which differ for each dimension. Further sub-dimensions of these categories are generated for the interactive, cognitive and meta-cognitive categories.

However, each sub-division is based on separate and unrelated theoretical models. In particular, the cognitive skills category is based in the first instance upon criteria generated from the North American teaching objectives for knowledge acquisition and secondly, but equally, upon learning models (Entwistle and Waterston 1988) that bear strong similarities to the conversational models of learning. Not only are these two theoretical perspectives inconsistent with each other but they are not consistent with the practical models used to initially motivate the cognitive dimension. Further, the theoretical motivation for divisions in the meta-cognitive category is made on the basis of a distinction between declarative and procedural knowledge that is then re-interpreted, and with respect to the view taken in this study incorrectly (section 2.3.2.1), as an uncomplicated distinction between knowledge and skills.

Nevertheless, one of the main difficulties with Henri's (1992) first version of the framework is with the unit of analysis. She was among the first to consider that the CMC message is a subjectively constructed unit, and so difficult to codify (see also Howell-Richardson and Mellar 1996). She proposes instead a 'unit of meaning'. However, her explanation of the unit is not grounded within any particular theoretical framework, nor are the criteria made otherwise explicit. Therefore, not only is this unit undefined, but with so many inconsistent assumptions underlying the different dimensions, and even within the same dimensions, the unit of analysis within one dimension cannot be the same unit within another.

In the second version of the framework (Henri and Rigault 1996) this issue of lack of consistency in the operationalization stage is addressed. A new unit of analysis, the speech segment, is introduced. The speech segment is derived mainly from pragmatic linguistics and from the Geneva School, in particular (Moeschler 1985, 1989). In Henri and Rigault's work the speech segment is considered as:

> "the smallest unit of delivery, linked to a single theme, directed at the same interlocutor (singular, plural or indefinite), identified by a single type (linguistic), having a single function (in relation to the strategies)."
> Henri and Rigault 1996:62

To form the analysis grid a speech segment is defined as consisting of three elements: characteristics, functions and content. Characteristics and functions are further analysed into their constituent elements represented in a series of multiple branching trees that are used as the grid to analyse and classify the speech segments. As a whole the grid addresses a very wide range of relations and constructs. In particular, four aims stand out. One is to map interactivity through analysis of messaging direction and coordinates. Another is to consider the relevance of the unit in relation to the topic and instructional objectives. A third is to analyse cognitive processing strategies. The fourth is to provide a branching typology of speech acts against which utterance functions are mapped. Further, identification of the functions is assumed to provide a window to the cognitive processing strategies used.

The difficulty with this design is that the characterisation given for the speech segment is not consistently applied across all elements of any of the trees that make up the analytic grid. Firstly, the segment as initially characterised, following Moeschler, is a unit of discourse. It therefore cannot be used in the same way to analyse interactivity, relevance or cognitive strategy, although most trees in the grid pursue more than one aim in parallel. Secondly, no theoretical or empirical grounding is provided for the development of the typology of utterance functions that are used as elements of the grid. Moreover, Henri specifically states that the segment is not to be confused with the speech act. This raises questions over the means through which a form-function mapping can be made, since no account is offered of a procedure that fulfils the contextualising role of felicity conditions in Speech Act theory.

In a third major trial of Henri's framework, Hara et al (2000) applied the scheme to analyse the quality of commentary and the depth of cognitive processing in an online, graduate level, cognitive psychology course. Hara and her research team adopted the original five dimensions of Henri's framework, and made a number of modifications to the implementation in order to address the issue of the lack of precise criteria for the analytic categories. Firstly, they added a few categories to the framework and rephrased

several of the descriptions of the indicators in order was to customise the framework, but no significant changes were made. Secondly, they defined the unit of analysis as an "idea unit". But though this was initially considered equivalent to the textual unit of the paragraph, in practice some paragraphs were coded as containing more than one idea unit (Hara et al 2000:122) and thus there is effectively no clear definition of the unit.

Thirdly, they chose to be eclectic in the methodology used to implement the framework. Patterns of participation and interaction, which are the first two dimensions, were mapped and coded using a scheme developed by Howell-Richardson and Mellar (1996). Henri's categories were then used to code the social cues, cognitive and meta-cognitive dimensions. However, one of the meta-cognitive categories (strategic knowledge) was omitted as it was found to be impossible to systematically implement in exploratory trials. Depth of processing, which in Henri's analysis is measured by the cognitive skills dimension, was evaluated semi-impressionistically at the level of the message, as Henri's criteria for this dimension were considered subjective and arbitrary. Moreover, in their review of the methodology for this study, Hara et al conclude that, the categories are difficult to evaluate and interpret and that the lack of reliable and valid criteria for these categories leads to results that are not only subjective but also superficial.

In conclusion, Henri's framework has been much cited in the CMC literature. The framework addresses a number of the issues raised with respect to online course delivery, and specifically the questions over the quality of learning, the cognitive and discourse strategies used and the nature of interaction. It thus sets the paradigm for the nature, scope and complexity required of a content analysis scheme for CMC courses. Further, the difficulties encountered in designing and applying the framework identified, at an early stage, many of the issues inherent in developing this type of content analysis. In particular, Henri's work has highlighted the difficulty of defining the unit of analysis and of identifying online behaviour onto which the categories of the cognitive dimension can be mapped.

2.4.2. Mercer: Modes of Thinking in Co-operative Groups

Mercer's (1995, 2000) research on the talk types learners engage in when involved in collaborative tasks, has developed from ethnographic research studies on the SLANT (Spoken Language and New Technologies) project (Mercer 1994), which involved both intensive qualitative analysis of transcripts, interviews and large scale computer-based analyses, using concordance programmes (Wegerif and Mercer 1997). The aim of the project was to investigate how learners use language in collaborative tasks and to consider how educators can guide learners to use talk effectively to jointly process and act on information in the pursuit of shared knowledge and understanding. From this basis, Mercer has developed his theory of the guided construction of knowledge (1995, 2000).

However, the relevance of Mercer's work to this thesis is not this theory, but the particular ways of talking which the analysis of the data for the SLANT project identified. The analysis showed that participants working in co-operative groups on computer-based problem-solving tasks typically engaged in quite specific ways of talking. These different ways of talking represent different social modes of thinking and different ways of working together. Some of these ways of talking are considered more conducive to the joint construction of knowledge than others.

Three broad types of talk were identified (Mercer 1995:104):

- *Disputational talk.* This talk type is characterised by disagreement and individual decision-making. There are few attempts to pool resources or to offer constructive criticism. The conversation around the task is typically monologic and topic development occurs on an individual basis. The characteristic discourse features of this talk type are short exchanges consisting of assertions and counter assertions or challenges.
- *Cumulative talk.* The speakers build positively but uncritically on what the dialogue partners have said. Talk is used to construct a common knowledge base by accumulation. The characteristic discourse features Mercer identifies for this talk type are repetitions, confirmations and elaborations.

- *Exploratory talk.* Partners engage critically but constructively with each other's ideas. Statements and suggestions are offered for joint consideration. When these are challenged and counter-challenged, the challenges are justified and explained and alternatives are offered. Knowledge is made accountable and reasoning is explicit, elaborate and highly visible.

Mercer's main concern is with the description and evaluation of exploratory talk, and with establishing the conditions under which this talk type can be promoted in educational settings. It would therefore be inaccurate and unfair to represent the three ways of talking as being intended to serve as a content analysis scheme. Nevertheless, as the three modes of talking identify quite clearly distinct verbal behaviours and do not rely on embedded levels of analysis, these categories can be used as a relatively reliable, practical and quick method of evaluating CMC learner dialogue (e.g. Pridmore et al 2002).

2.4.3. Pilkington: The DISCOUNT Scheme

The DISCOUNT mark-up scheme aims to describe and evaluate educational discourse, and to identify patterns in educational dialogue to specify scripts for computer-based systems that interact with users. The scheme is developed for application to general educational dialogue, and has also been applied to analyse and mark-up CMC educational dialogue (Pilkington 1999, Kneser, Pilkington and Treasure-Jones 2001, Pilkington and Walker 2003).

The scheme consists of a suite of analyses formed by a coding scheme that is based on three separate theoretical frameworks and triangulation of the outcomes of the coding analysis using independent performance indicators of learning activities. The three main theories on which the coding scheme is based are transactional analysis and exchange structure theory (Sinclair and Coulthard 1975, 1992), logical dialogue game theory (Walton 1984) and rhetorical structure theory (Pilkington 1999, Pilkington and Treasure-Jones 2001).

The transactional analysis theory used in the scheme is based in Sinclair and Coulthard's (1975) original work on classroom discourse and their development of exchange structure theory. The exchange structure theory establishes an exchange as consisting of three dialogue parts: Initiate-Respond-Feedback (the IRF structure). An exchange is the smallest transactional unit that can stand alone. It is made up of speaking turns. A speaking turn consists of (content) propositions and one or more moves. A move is a communicative act, which serves to achieve a dialogue goal. Moves have a speech act function.

In the DISCOUNT scheme certain modifications are made to Sinclair and Coulthard's account of exchange structure theory. Firstly, the IRF notation is altered to Initiate-Response–Response Complement (IRRc) to avoid confusion with the move level term feedback. Secondly, Stubb's (1983) descriptors of the IRF exchange types as either predicting (predicting a response) or non-predicting (predicted by a previous remark) are added to the coding indicators to increase inter-rater reliability in the coding of the exchange structures. Thirdly, in the DISCOUNT scheme, the additional Re-Initiating (RI) exchange type is introduced to capture moves that are backwardly referential, and mark the need for repair, request for clarification, critique. Fourthly, a stand-alone category is introduced to identify monologues that, although initiating, do not result in exchanges.

Lastly, Pilkington (1999) develops a higher-level unit to represent the topic focus. This unit is called the episode. An episode (topic) is defined as the same hyponomously related focus space, derived from Halliday and Hasan's (1976) work on cohesion and coherence. Topics develop referentially from each other into sub-topics and these are represented as parent-daughter relationships. The tracking of the topic development through sub-topics is performed on the basis of Halliday and Hasan's (1976) work on coherence and theme and rheme (Halliday 1967). This establishes the parameters of an episode. A new episode begins when the conversation moves to an entirely different topic.

As used in this scheme transactional analysis achieves a number of outcomes. It enables researchers to allocate utterances to participants. The IRRc coding also maps the dialogue roles adopted by participants within local episodes and across the overall conversation. Specifically it maps the Initiating and Re-initiating roles in contrast with the more passive Responding role. The coding also maps the development of each topic and shows how participants have collaborated to explore the topic through opening, developing and closing exchanges within the episode. Further, as the transactional function of an educational exchange is a learning activity function, content analysis of the exchanges within the episode can show whether or not the learning outcome of the exchanges was successfully completed.

The second theoretical frame within the coding scheme is logical dialogue game theory (Walton 1984), which Pilkington used to establish a typology of rhetorical functions that are typically used in educational discourse to realize specific moves. This approach is concerned with prescribing a set of rules, which, if followed, ensure a dialogue exchange serves a particular purpose. It involves establishing a strict ideal schema for the dialogue in which each participant has a set of highly prescribed moves available which can only be 'played' in a particular set of conditions. The move publicly commits the participant to a predicted set of consequences.

As Pilkington observes these rules and prescriptions cannot be applied to natural dialogue. In natural dialogue the equivalent are the pragmatic constraints operating on conversation in general and those specifically embedded within the activity type (Levinson 1992). Skilled users of the language employ these pragmatic principles subconsciously to make inferences about what their interlocutors may reasonably say, believe or intend by their utterances. Moreover, not only has game theory not been widely used to model educational dialogue, but also the contextual factors which determine the types of move participants make, and the consequences of the move, are ideationally and socially determined and not solely determined by their functional role in the interaction.

Therefore, Pilkington is not using the game theory approach to model the dialogue. Instead she takes from game theory the principle of seeking to establish a typology of rhetorical functions that are typically used in educational discourse to realize specific moves. It is an approach intended to address the difficulties of form-function mapping, which is not addressed by Sinclair and Coulthard (1975) who offer extensive lists of educational moves but no specification of the semantic and pragmatic properties of the expressions used to realize these moves. Pilkington's approach is also consistent with the aim of specifying scripts for interactive, computer-based tutoring systems.

The third theoretical basis of the scheme, rhetorical structure theory (Pilkington 1999, Kneser, Pilkington and Treasure-Jones 2001), is concerned with the issue of form-function mapping. When used for the analysis of text types, rhetorical structure theory shows how the representation of the ideational content is managed through the identification of rhetorical predicates. Rhetorical predicates are used to link content propositions together, and the way in which they used (and specifically the choice of one predicate over another), gives a reasonable interpretation of the text type and purpose. For example, a typical argument structure for an expository text would include 'inform' rhetorical predicates at the top-level with 'causal' rhetorical predicates used to signal propositions in a supporting or justifying pòsition. Instruction manuals typically include 'causal' predicates as the top level structure (predicating a problem-solution approach) with supporting propositions expressed through 'instrument' and 'achievement' predicates.

Pilkington argues that dialogue has a similar argument structure to written texts, and this may be especially salient in the analysis of CMC dialogue. The DISCOUNT method is to use the typology of rhetorical predicate labels to track the ideational content and argument structure as it develops across dialogue turns, and to specify how propositions are linked using these rhetorical relations. Moreover, the rhetorical predicates are used in a bottom-up procedure to identify moves, i.e. to accomplish form-function mapping in the interpretation of communicative acts.

Pilkington provides an extensive and impressive typology of rhetorical expressions forms accompanying educational moves that typically occur in educational dialogues. The typologies are classified according to four main move types: Inform moves, Reasoning moves, Inquiry moves and Responding moves.

The coding scheme is graphically represented in figure 2.2 below:

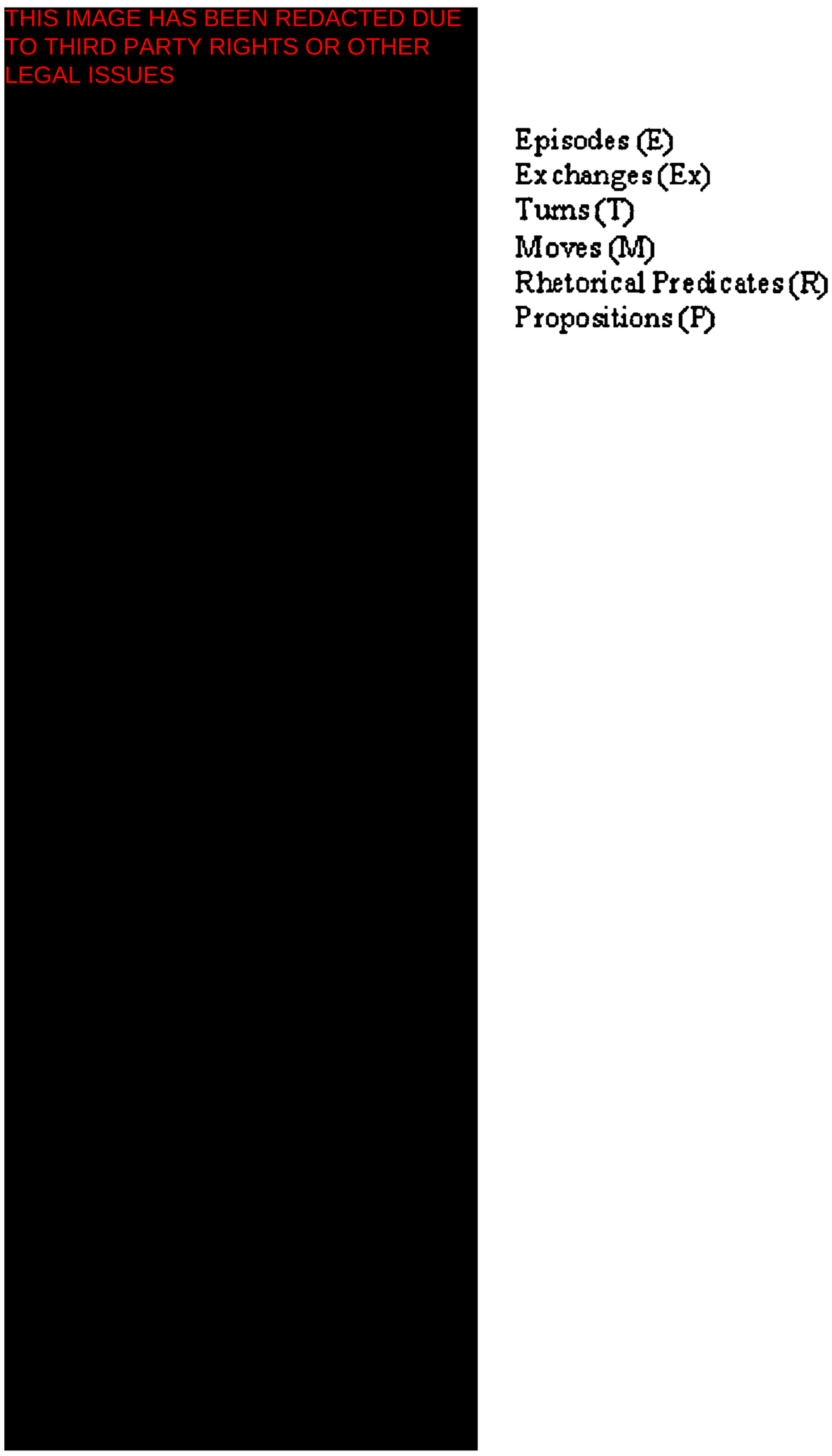


Figure 2.2. Episode and Exchange Structure (Pilkington 1999)

Notably, the unit of analysis varies with the level of analysis to be performed. An episode consists of a group of exchanges. An exchange boundary commonly co-occurs with a turn-boundary. However, exchange structure boundaries do occur within turns, and this is marked within the DISCOUNT scheme. A move may consist of none, one or more words within a phrase or sentence. In contrast, a rhetorical relation demands that two or more idea units (propositions) are related. This approach is motivated by the different analytic schemes that make up the DISCOUNT framework. It is appropriate and workable as the different levels operate independently and only the output of each level is used to inform interpretations on other levels.

Analysis of the coded data gives information on the dialogue roles adopted by participants in the educational dialogues. This includes information on an individual's rates of activity and the participant roles they adopted (within the range defined by the exchange categories). The analysis also identifies stretches of dialogue where critique or challenge takes place and sections where knowledge is jointly developed. This information is then used to identify the patterns of exchange dialogue roles, in terms of whether interaction is symmetrical or asymmetrical and knowledge building or critiquing. These patterns are triangulated against the DORMOBILE scheme to match them with their associated learning activities. Finally, the episode outcomes, which are defined as sets of agreed statements and identified as ideational outcomes and commitment (level of commitment to the propositional content) are tracked using the semantic properties of the lexis recorded at the rhetorical structure level of analysis.

The DISCOUNT scheme is a very useful analytic tool. The hierarchical structure of the framework gives a comprehensive account of a dialogue. The suite of analyses work consistently together and the criteria for coding at the separate levels are not only comprehensive but also explicit and well justified. The range and relevance of the outcomes of the analysis is impressive.

However, although the framework generates sets of prototypical schema for the dialogue, and its outcome matches the aim of generating schema for human-computer interactions,

it is less suitable for examining how individuals in a particular conversational setting construct their relationships and knowledge through their choice of language. The DISCOUNT scheme does not provide an analysis of the pragmatic constraints and the pragmatic information, which individuals use when engaged in conversation with others in order to arrive at an interpretation of meaning. In DISCOUNT, the identification of the propositions and speech acts in the communicative acts (as realized in the move category) is made on the basis of the typical meaning conveyed by choice of a particular expression or word. By contrast, in natural dialogue, participants make such identification by relying on the Gricean conversational maxims to guide their interpretation of the interlocutor's intended meaning. Moreover, as in all natural conversation much of the interpretation of speaker meaning involves inference and induction, especially with respect to the interpretation of indirect speech acts. For this thesis, therefore, DISCOUNT cannot provide a full enough description of a how a specific online learning group uses discourse to manage interaction and to achieve the goals.

2.4.4. Howell-Richardson and Mellar: A Speech Act Framework

The fourth framework reviewed here (Howell-Richardson and Mellar 1996) was published as a working paper for this thesis. With hindsight the framework has two main limitations. Firstly, as a coding scheme it attracts a number of the same criticisms of subjectivity as were made of Henri's scheme (Hara et al 2000). Secondly, it is based in a theoretical framework that is not adapted to capture communicative goals or the dynamism of meanings in collaborative talk. However, the framework was devised *ab initio* to investigate certain hypotheses about approaches to the analysis of CMC text; and as such makes no strong claims. The importance of the framework is that firstly it is one of the few attempts to base the content analysis in linguistic theory and secondly, that it successfully integrates quantitative and qualitative approaches.

The research methodology is divided into two parts. A quantitative approach is used to discover rates of participation and interactivity. The analysis is made on measures of message length and distribution and a mapping of inter-message referencing. A qualitative approach is used to investigate message content, with the concept of the

illocutionary act as the unit of analysis. The two approaches are seen as complementary and to an extent inter-dependent in a proper description of CMC-based co-operative activity.

The quantitative approach provides information about the structure of the interaction that is required to establish whether or not the interaction is co-operative. In particular the approach reveals whether participation is evenly distributed or dominated by a minority. It also indicates the level of interactivity, as measured by the direction of messaging, degree of cross-referencing and speed of message exchange. Finally, it can show which topics are selected for development and the degree of interest they attract.

The purpose of the content analysis is to uncover in a systematic manner how the interaction, which is reflected in the structural patterns, is developed through negotiated talk. The analytic framework for the qualitative analysis is based on traditional speech act theory (Austen 1962, Searle 1969). As a consequence of taking the illocutionary act as the basis of the analytic unit, the unit is automatically marked during the procedure of identifying the illocution. This overcomes the problem of relying on potentially arbitrary judgements as to whether or not a set of wordings constitutes a single unit of meaning. The illocutionary acts embodied in the messages are classified within a systemic network (for a discussion of systemic networks see Bliss, Monk and Ogborn 1983).

A unit of analysis is identified as a syntactic structure that satisfies the description given for each illocutionary act that is isolated. This is similar to the criteria Henri and Rigault (1996) use to identify the segment in their scheme.

Once entered into the system and classified by illocutionary act, each unit is further classified according to three factors:

- whether the perlocutionary force of the unit concerns the group, the task or is off-task
- target addressee
- whether the message makes reference to other messages

The analytic framework does indeed enable the identification of important differences between interactions in different conferences. Nevertheless, the instrument has its limitations. Firstly, given the limited set of data used to generate this pilot, it is difficult to validate categories in which few instances occur within this data, yet which experience suggests would be valid for more extensive sets of data. Secondly, certain multi-functional categories, and, in particular, initiate/propose and confirm/elaborate/develop, have proved insufficiently sharp to enable the coding to distinguish between different types of verbal acts (Hara et al 2000). The difficulty is to allow sufficient focus within categories to account for the data without generating too many categories.

Further, there are more general problems with the application of traditional speech act theory to the analysis of conversation. Speech acts are verbal acts, where saying something performs an action. A speech act is an action, which although interpreted through reference to context is independent of its context. Parties to a conversation, on the other hand, talk in a "sequential context" (Schegloff 1988:61) where proximal utterances constrain the choices for ensuing talk. Applying traditional speech act theory to natural conversation, (i.e. to discourse as opposed to individual units) then encounters the difficulty of multiple, inconsistent assignments of illocutionary force; all of which are consistent with the theory (Levinson 1981).

These difficulties of form-function mapping can be eased if the state of knowledge of participants is known and if the aim of an utterance is identified as serving a higher-order goal. Further, since each move in a conversational exchange affects proximal moves, any form/function mapping must take account of the effect not only of the conversation on any utterance, but of the utterance on the interaction; i.e. the transactional effects. Traditional speech act theory (because it works at the level of sentence) fails to do this.

Nevertheless, there are still fairly strong arguments for basing at least part of the analysis in speech act theory, although modifications would need to be made to give it adequate explanatory power for analysis of natural conversation. The strength of speech act theory is that it offers a relatively explicit theory of communicative actions. Searle (1969) for

instance explicitly connects speech acts and goals, and lays out the sufficient and necessary conditions for the felicitous performance of the acts. Alternative approaches, like the work of the Relevance theorists (Sperber and Wilson 1986) are far less rigorously explicit about their mode of interpretation. Moreover, interlocutors often express their interpretations of other's remarks in terms of speech acts. Hence a natural educational discourse frequently includes comments like " A and B claim x" "A proposes that.." "The theory suggests.." "The data indicates/shows..". Finally, speech act theory has an established place in software design in the area of CSCL- for an early example see Winograd and Flores (1987).

The scheme developed for this thesis includes speech act theory as one of its components. However, modifications have been made to the approach taken in this working paper in order to provide a more reliable means of form-function mapping.

2.4.5: Newman, Webb and Cochrane: Content Analysis Framework

The fifth framework reviewed (Newman et al 1995) was published as a working paper, and has not been significantly further developed. Nevertheless, the paper is frequently cited.

This content analysis was developed to measure critical thinking during group learning in a comparative study of face-to-face and online (CSCL) conditions. The content analysis method was developed through identifying in transcripts examples of indicators of critical and uncritical thinking. The procedure was reinforced by the results of a student perception questionnaire.

Critical thinking is described as a dynamic activity, in which critical perspectives on a problem develop through both individual analyses and social interaction. Newman et al view critical thinking as a collaborative activity, which includes the application to specific tasks of the meaning structures and principles of the topic being studied. Through successful group problem solving, learners develop critical understanding of the subject needed for deep learning.

The framework thus selects the fourth of Henri's (1992) (see also 2.4.1) five dimensions for evaluating CMC, i.e. the cognitive dimension. The study focused on the cognitive dimension as most relevant to the aim of investigating critical thinking, and excludes methods of collecting data on the participative, social and interactive dimensions. It thereby avoided many of the contradictions involved in operationalising a number of different analytic levels in parallel, which is the main weakness of Henri's framework.

The parameters for the framework were developed using Garrison's (1992) model of critical thinking as a five-stage process, which corresponds closely to the five cognitive skills Henri (1992:129) recognises as significant to the cognitive dimension. The textual indicators of critical thinking were identified using Henri's indictors for each of her cognitive skills. These indicators were then used to classify statements in the transcript according to Garrison's five stages. Henri's procedure of using lists of paired opposites, one as an indicator of surface processing (uncritical thinking) and one as an indicator of deep processing (critical thinking) was adopted as a means to address the quality of the discussion. However, as Henri's indicators were considered too broad, Newman et al developed their own sets of paired indicators by breaking down Henri's categories into several smaller categories. This was done by looking for indicators in all of Garrison's stages, and was also based on their own experience and the results of the questionnaire.

The outcome is a framework consisting of ten primary categories:

- relevance
- importance
- novelty
- ambiguity and clarity
- bringing outside knowledge and experience to bear on a problem
- linking ideas and interpretation
- justification
- critical assessment
- practical utility
- width of understanding

Each category contains a number of sub-categories with criteria defined to identify the paired critical and uncritical indicators of these cognitive skills in the transcripts.

In this study, not every statement in the transcript was marked up. Only the obvious examples were included in the data, to avoid the need for subtle, borderline judgements. There is no defined unit of analysis. The statements may be any textual unit, containing at least one of the indicators. Thus a statement can contain more than one indicator. Finally the totals for each indicator (measuring critical and uncritical statements) were counted and a critical thinking ratio was calculated for each.

This was a small-scale study, which has not been extended to test the categories or to modify the indicators. Nevertheless, it is a useful case study because it shows that subjectivity can be reduced in making judgements about the quality of an online learning discussion through the choice of indicators and through providing well defined, theoretically and empirically motivated criteria to identify them.

2.4.6 Issues in Framework Design

Various conclusions arise from the preceding survey. While each of the five frameworks considered represents a different solution to the task of analysing the content of CSCL groups, each also reveals unresolved issues in the design. Drawing upon this review, it is possible to summarise the issues that will need to be dealt with when designing a new framework, as this thesis intends to do[4].

1. *Interpretation of the form-function relationship*

The issue is to arrive at a grounded interpretation of the intended meaning, on the basis of the speaker's choice language. This can be particularly difficult with respect to indirect speech acts. Difficulties in establishing theoretical criteria to guide the reading of the

[4] The review of the framework in section 6.4.1 includes discussion of the extent to which the analytic framework developed for this thesis addresses these issues.

form-function mapping can lead to the intrusion of subjective judgements in making the interpretation, and thus higher rates of subjectivity in coding the data.

2. Identification and definition of the unit of analysis

A number of issues were raised over the unit of analysis. In a multi-dimensional framework it is appropriate to use more than one unit of analysis. However, many studies lack a firm definition of the unit at the level of ideational content. It was also noted that an appropriate unit for the discourse analysis is a unit defined by pragmatics; whether the "speech segment" (Henri and Rigault 1996) or "speech act" (Clarke et al 1996, Howell-Richardson and Mellar 1996) or some other unit. Although in the studies reviewed, neither the speech segment not the speech act proved a practical unit for this analytic task, one great strength of taking the pragmatic unit as the unit of analysis is that it eliminates the need for a separate level of coding description.

3. Multi-level analysis over the same stretch of discourse

Meaning is multi-componential, and the processes of inference and induction that are involved in an interpretation of meaning in natural dialogue are conducted over several modes of information. Moreover, the content analysis schemes that have been designed for educational purposes are multi-dimensional and address different aspects of cognitive processing and cognitive strategy. It follows, therefore, that different, but complementary, levels of analysis need to be conducted over a single stretch of discourse in order to simulate the conditions of natural dialogue.

4. Definition and use of context

Speaker meaning in natural dialogue is interpreted within a specific context of use. The issue for a research methodology, involving a discourse analysis, is to determine which types of contextual information should be included in the analysis and which types can be excluded. This is decided partly by the objectives of the research and the type of analysis performed. For example, those types of analysis (e.g. Relevance theory (1995)) which seek to explain the cognitive processes involved in interpreting meaning require a theory of context. Other types of analysis, for example those that seek to investigate the

structural properties of the discourse, (e.g. Sinclair and Coulthard's (1975) IRF method) are conducted on more specific categories of context.

The analysis of CMC discourse raises specific difficulties for the definition of context, as there is no shared physical or co-temporal setting.

5. *Sensitivity to changes in use or changes in meaning associated with content, or group specific concepts and lexis*

As the group progresses with its learning task, and develops deeper and altered understanding of the concepts and topics of the subject material, then the use and conceptual associations of specific lexis and descriptive terms and phrases change. Further, CMC groups have been observed to develop in-group jargon, to use puns collectively, or to chain specific words.

Top-down analyses, based in pre-formed categories, do not automatically capture these changes in meaning, which are part of the adaptive use of language that characterise the dynamism of natural language use. However, identifying and tracking such changes is important to the study of CMC discourse, since it indicates both social and conceptual interaction.

6. *Inclusion of interaction analysis of message direction in addition to content analysis*

Interaction analysis of CMC transcripts traces the direction of messaging, and the frequency and the distribution of messaging across the population. This allows the researcher to identify topic clusters, to monitor the spread of messaging across the population and also to observe the extent to which individual participants are involved in the discussion.

In a communications environment where responses to messages are not guaranteed and where some topics are left to decay, interaction analysis provides information on the ways in which the participants in a particular CMC discussion develop their conversation.

It also provides some information on the social relationships within the group. This information is observed, as it unfolds, by participants in the discussion, and often underlies the types of contribution they make. An interaction analysis therefore supplements the content analysis by providing a profile of the general activity rates within the discussion and of the relative status of the participants.

2.5.CONCLUSION

This review of the literature shows that the context of CSCL is potentially a rich social environment, which can support the development of learning communities and successful co-operative learning groups. Further, within this thesis, learning is viewed as a social process, involving dialogue within the peer group and with more competent others leading to a critical understanding of the subject material. The text-based nature of CMC, coupled with distributed participation (spatial and temporal) not only allows more time for reflection than face-to-face seminars, but also increases the intensity of the task and information focus, which raises the likelihood of questioning and critique.

However, the success of online learning groups depends upon effective group management and course designs that are appropriate to the task, the online environment and the learning goals of the participants.

A range of content analysis schemes has been reviewed. However, none of these schemes have successfully addressed the issue of form-function mapping in natural CMC discourse. Instead, most rely on top-down categorisation of the data. One reason for the difficulty in arriving at a reliable means of establishing form-function mapping may be the absence of a description of electronic discourse, which has been recognised as a new register, but not yet fully researched and documented.

One feasible line of enquiry, which addresses this issue, is to attempt to understand how participants in the conversation interpret utterance meaning. This information can be examined using pragmatic frames of reference, and specifically neo-Gricean theories of

meaning and utterance interpretation. The next chapter reviews these theories, with the aim of establishing their suitability for this purpose and selecting the theoretical framework, which will be used for this level of analysis in the framework developed for this thesis.

It is acknowledged that content analysis schemes for CMC and CSCL groups should consist of multi-dimensional levels of analysis. Further, an investigation of utterance meaning cannot be accomplished in isolation from salient contextual information, including information on the local textual context and the wider context of the goals of the activity type. The content analysis scheme, developed in this thesis, will therefore consist of a suite of analytic frameworks, derived from linguistic theory. The scheme is presented in chapter 4 and the results of the trial and implementation are presented in chapter 5.

Finally, the discussion in this chapter has led to the refinement of the research aim of this thesis. The research aim is:

To develop a multi-level scheme for the content analysis of CMC discourse, and of the discourse of CSCL groups in particular,

which will

(a) provide a detailed description of language use and discourse strategies within the CSCL groups in the study

and

(b) serve as a pilot scheme for the development of a content analysis evaluation tool.

CHAPTER 3: PRAGMATIC CONVERSATIONAL PRINCIPLES

3.1. INTRODUCTION

In the previous chapter it was claimed that participants in online learning groups are able to attain levels of achievement that parallel or can even exceed outcomes in traditional learning modes. Nevertheless, CMC-based learning presents an altered social, linguistic and educational context. Use of co-operative and collaborative tasks and techniques (CSCL), which require the mutual interdependence of group members and thus involve the construction and maintenance of shared understanding, has proved an effective model for online course design. The aim of this study is to examine how postgraduate participants in a CSCL group use language to conduct their interaction and to complete their task.

The research for this thesis has shown that the development of a content analysis scheme for CMC-based learning is still a research task (section 2.4). Moreover, research on the description of the discourse of CMC learner groups is also at a relatively early stage (section 2.2.2.1). On the basis of the literature review therefore, the research task for this thesis is defined as developing an analytic framework to examine the discourse of participants in CMC-based co-operative learning (CSCL) groups to

1. describe their communication strategies and the style (or manner) of their communications,
   with the two sub-aims of:
   1 (a) to consider how the participants in the CSCL groups manage their interaction
   1 (b) to contribute to the description of electronic discourse as a new register

2. To consider whether the discussion in these groups displays a deep level approach to learning.

As observed in the literature review, one of the main issues in the design of a content analysis scheme for CMC is the difficulty of form-function mapping (section 2.4.6). Further, many of the existing schemes, reviewed in section 2.4, involve top-down categorisation and classification. But, in the absence of a description of the discourse of online learner groups, there is no accurate way to interpret speaker meaning in this altered context. The aim of this thesis is to arrive at a comprehensive description of the way language is actually used by the participants in the study, in order to derive a higher-level description of their discourse. The aim is, therefore, to adopt a phenomenographic approach (section 2.3.2.2) to the research task. This will be done by developing a framework that conducts the analysis on the basis of the choice of linguistic expression, and on the application of general, well established, Gricean principles of conversation.

This chapter sets out the arguments for a theory of utterance interpretation on the basis of which an analytic framework will be developed in chapter 4. The theories discussed in this chapter are those concerned with developing pragmatic accounts of utterance interpretation. Pragmatics has been selected, as it is the branch of linguistics specifically concerned with language in use, speech act theory and the co-authored nature of talk.

Following a general introduction to the nature of pragmatic meaning, the focus of the chapter is to discuss the major possible theories. These are all Gricean approaches to meaning and utterance interpretation. The argument begins with a discussion of Grice's theory of conversation and then proceeds to discussion of the work of the London school of Relevance theory and finally the school of neo-Griceans, and specifically Levinson's theory (1987, 2000) of generalised conversational implicature. The analytic framework, which is developed in the next chapter, is based mainly on Levinson's theory, but it also contains elements of Grice's original scheme for the categorisation of meaning types and makes reference to aspects of the Relevance Principle.

The focus of the study is therefore linguistic and cognitive. The analysis will be based on linguistic form and related to the structure of the conversation and the goals of the speech event. Therefore, the study does not consider social aspects, such as power

relations, social distance, politeness factors, or face-saving strategies. The focus is on how participants in structured CSCL tasks construct and maintain their conversation in order to consider whether the participants' communication is adapted to the mode in particular and predictable ways. This relates to the wider questions that logically follow the kind of analyses dealt with in this thesis.

3.2. MEANING AND INTERPRETATION OF SPEAKER MEANING

3.2.1. Introduction

The goal of a theory of discourse is to provide an account of the human ability to construct and understand discourse of different kinds and in different media: oral, written and even visual. In contrast, the goal of pragmatic theory is to provide an account of interpretative competence (Green and Morgan 1981, Sperber and Wilson 1986, 1995, Blakemore 1992, Grundy 1995, 2000), that is to explain the principles and mechanisms of communication which enable us to understand what is meant by a particular utterance or sentence on a particular occasion. Pragmatics is concerned with language in use; and specifically with the ability of speakers and hearers, and writers and readers, to reach common understandings when they talk together.

Any attempt to describe the ability to interpret verbal communications must recognise not only that this ability is part of Chomsky's Competence but also that the speaker's production is influenced by how he or she expects the utterance to be interpreted. Where pragmatic theory differs from a general theory of discourse competence is that it seeks to explain interpretative competence but not to predict the syntactic, semantic or phonological features of any particular utterance. Specifically, pragmatic theory addresses the question of the relationship of meaning and linguistic form and the mechanisms through which an interpretation is reached.

But what is the raw material that is interpreted? The obvious answer is that the meaning of the sentence or utterance is interpreted. However, the notion of meaning is itself complex and controversial. There are numerous versions of the nature of meaning and different accounts of the source of interpreted meaning. Moreover, pragmatic meaning is only one aspect of verbal communication. A role for pragmatic meaning in discourse will be mapped out through this section. The intention is to

show how traditional accounts, which are based upon syntactic and semantic theory alone, fail to provide a full account of meaning, and to show how pragmatic principles can be used to explain additional levels of meaning.

3.2.2. Propositional Meaning

On this account to know the meaning of a sentence is to know, in the sense of being able to describe, the conditions under which the proposition expressed by the sentence is true or false. The proposition, which is recoverable from the syntax and semantics, is always a descriptive statement, but it is not solely the property of declarative sentences. Thus, the truth conditions for a declarative require knowledge of the state of affairs if the description is true. To know the truth conditions for an imperative or a request is to know the changed state of the world if the command is obeyed, or the request fulfilled. In all cases knowing the conditions for truth entails knowing the conditions for falsity.

The assumption underlying the notion of propositional meaning is that there is a natural connection between meaning, truth and existence, and that this connection is somehow encoded in the syntax, grammar and semantics of the sentence. This is the basic thesis of traditional truth-conditional semantics (Lyons 1995). But how is truth-value assigned on the basis of the sentence? Russell's (1905) theory of definite descriptions holds that this type of expression denotes an entity and only one unique entity. Consequently any proposition expressed about this entity must be either true or false. In response Strawson (1950) proposed a third truth-value for referring expressions, the property of being neither true nor false. Positing this third value would enable us to talk about objects or people referred to, even if they do not exist in the material world. Therefore test examples like "The King of France is bald", which for Russell are meaningless since the sentence can be neither true nor false, are treated as possible to attest, but impossible to verify. However, this account of meaning runs counter to common sense as it excludes the use of this sentence to talk about an actor who plays the King of France, or to make an ironical statement. Furthermore, even if verification is necessary to meaning, the statement is impossible to verify only if Russell's uniqueness principle of definite descriptions is accepted, and if there are no other principles governing use of this type of referring expression.

Donellan's (1991) distinction between the referential and attributive uses of definite descriptions showed these expressions do have more than one use. The distinction is fundamentally a distinction of function, i.e. recognition of speaker intention, and is not marked in either the syntax or the semantics of the sentence. So, in Donellan's example sentence; "Smith's murderer must be mad", the definite description is referential if it is used to pick out an individual whom the speaker and hearer agree is the murderer, even if he is innocent. It is attributive if the expression is used to describe the guilty person, even if he is unknown to both parties. Only the attributive use has a propositional truth-value, although both uses of the sentence have meaning.

Although some critics (e.g. Kripke 1979, Searle 1979) argue Donellan's account is flawed as it specifically sets out and fails to undermine Russell and Strawson's theories of descriptions on semantic grounds, the referential/attributive distinction is mainly accepted. The difficulty with the original account is lack of clarity over how a referential use is separated from an attributive use. For instance Bach (1981) comments that Donellan offers six different descriptions to clarify the distinction, all of which are incomplete.

The incompleteness can be attributed to lack of attendance to general principles of communication that guide and determine an appropriate interpretation. Donellan's descriptions rely on the now outdated distinction between a sentence and an utterance. (e.g. see Widdowson 1983, Levinson 1983, Lyons 1995). This distinction formulates a sentence as a formal linguistic string, which can designate certain specific temporal and spatial aspects and semantically limits the possibilities of meaning. However, meaning can only be determined on a particular occasion of use when the sentence becomes an utterance. An utterance is therefore a sentence plus context. On this reading the truth-functional proposition is a component of the utterance.

Nevertheless, as the weakness of Donellan's description shows, if the description remains at the level of the sentence/utterance distinction, a theory of context is required to determine which aspects of context are salient on any particular occasion. Moreover, a specification of how the salient contextual information interacts with the participant's general schematic knowledge is needed. These extra-linguistic, procedural principles clearly form not only part of the process of communication, but

contribute to the derivation of a truth-functional proposition. They are pragmatic principles, and determine aspects of meaning that are not exclusively logically derived, as would be the case if meaning were purely propositional.

In conclusion, while propositional meaning is one aspect of meaning, a statement of the truth conditions depends upon a variety of factors related to the contexts of use. The next question to be addressed is whether a non-truth conditional semantics in association with the grammar (i.e. linguistic meaning) is sufficient as an account of meaning in use.

3.2.3. Linguistic Meaning

A non-truth conditional semantics states the features and properties of lexical items and gives information on how the lexis combines with the grammar and syntax. Moreover, the grammar, in conjunction with semantic input, includes a good deal of contextual information. This point is most closely associated with Halliday's (Halliday and Hasan 1989) concept of 'register' where grammatical and semantic options are selected from within a range restricted by contextual factors classified as the informative, communicative and affective channels and modes.

However, there are some very specific ways in which social theory and cultural practice have entered the grammar, and which can be identified even within traditional, non-Hallidayan grammars. The politeness principle is one example. Politeness is generally considered a pragmatic phenomenon (Brown and Levinson 1987, Leech 1983, Thomas 1990) since it encodes reference to the social relationship and power-relations of the speaker and hearer. Politeness is also a universal principle of language use (Brown and Levinson 1987), though the categories of politeness are not universals (Thomas 1990). Yet, although a pragmatic principle, politeness phenomena are captured within the grammar and examples can be found in all languages. For instance, in English politeness is most usually expressed through the modal system or modifications to the standard syntax. In most European languages (e.g. French German, Swedish and Greek) social distance can be marked through pronoun use.

Linguistic meaning can carry some variable context information. Is there therefore a need for an account of pragmatic meaning which is separate from non-truth-conditional semantics and which extends beyond the scope of semantics? If there is, then what is the relationship of pragmatics and semantics in the determination of meaning? The strongest argument in English that there is room for pragmatics as a separate dimension is that at the level of the sentence it can be impossible to determine the referents of lexical items or to resolve lexical ambiguity, using semantic criteria alone. Depending upon which referent is intended, what is formally expressed will have different meanings. In English this indeterminacy is especially marked in the deictic functions of the language; and person, place and time deixis (Grundy 1995:20-22) and the possessive (Blakemore 1992:83) are all typically underdetermined. The referent can only be determined with reference to non-linguistic information. Specifically, this involves identifying the deictic centre, or the point of origin, of the utterance. For example, an expression of time deixis, such as an adverb (e.g. today, this year) or verb tense, is temporally situated in relation to the time of the utterance. Similarly, referents of personal pronouns are determined with respect to the point of origin of the utterance; the default value for which is the speaker's perspective.

Since the referents (and so the meaning) of underdetermined structures and expressions are relational, there has to be some statement of what they are related to. In this text, the term 'context' has been used quite loosely to refer to the abstract area that defines some aspects of how an utterance is interpreted. However, the term is fairly meaningless without specification of which aspects of the situation are salient and how and why these are attended to. Throughout this chapter the notion of context, which is one of the most fundamental of pragmatic principles, will be reviewed and discussed. In the meantime, as the working hypothesis, I will draw upon Sperber and Wilson's (1986:15) definition of context, as the psychological common ground between the speaker and hearer that enables them to match their interpretations of the meaning and referents of the utterance.

Thus I am combining propositional meaning and linguistic meaning and setting them in contexts of use which allow the interlocutors to use their common understanding to determine the intended referents and lexis. But this is still not a complete account of

meaning. It does not account for occasions where the agreed interpretation of the utterance bears little relation to its literal meaning. The most striking examples of indirect meaning are metaphor and irony. However, indirect meaning is a very common feature of everyday communication, and it accounts for a large number of the mechanisms used to oil social interaction; for example 'face-saving' strategies (Brown and Levinson 1987), markers of deference and politeness, euphemisms, making requests or telling jokes (Grundy 2000:112-114). The aim of the next part of this section is to explore and discuss the nature of indirect meaning through a critical consideration of Grice's theory of meaning (1957, 1968, 1975a) and traditional speech act theory (Austin 1962, Searle 1969, 1975).

3.2.4. Grice's Theory of Meaning

Grice (1957, 1968, 1975) draws the distinction between what is said (literal meaning) and what is implicated. This distinction is formally expressed as natural meaning (meaning n) and non-natural meaning (meaning nn). Meaning n is an entailment. The meaning is present on every occasion of use. In the example (from Grundy 1995) "they won the (football) match" the item 'won' carries the stable meaning that they scored at least one goal more than their opponents. However, the same sentence can be used to express Grice's meaning nn; and thus also to express an implicature. An implicature is any non-conventional meaning that is implied, i.e. conveyed indirectly or through hints and understood implicitly without ever being explicitly stated. Therefore, if the sentence were used to talk about a strong team playing against a weak team, then the non-natural meaning (or implicature) is that they played badly. Alternatively, if the team in discussion is weak but took on a mighty opponent, then the implicature is that they played exceptionally well. Non-natural meaning is only sometimes associated with the expression it is derived from. It is as a consequence not part of the semantic meaning of the expression, but it may be conventionally associated with the expression within certain contexts of use (Morgan 1978, Sadock 1978).

Grice offers two compatible explanations for the means through which the non-natural meaning is appropriately derived from an expression. One explanation is the Co-operative Principle of conversation, which states a set of ground rules for the effective management of conversation (see section 3.4 for a detailed discussion).

According to the Co-operative Principle the hearer expects the speaker to be as informative as possible and seeks to discover what the relevant value might be. Drawing upon the resource of their common set of assumptions about the world (including knowledge of the rules of conversation) and upon other types of procedural and schematic knowledge, the hearer is able to derive the intended inference.

The second explanation is a theory of meaning based on recognition of the speaker's intention. Grice proposed the following analysis of meaning, which is, moreover, not limited to linguistic utterances but refers to all forms of communicative behaviour:

> '[S] meant something by x' is (roughly) equivalent to '[S] intended the utterance of x to produce some effect in an audience by means of the recognition of this intention'.
> (Grice 1957:58)

Grice modified the formulation of this analysis in later papers (Grice 1968,1975) changing the characterisation of what he called the 'M-intended effect', or the meaning-intended effect. The later version shifts focus from the desired behavioural goal to the recognition of the speaker's propositional attitude; and was probably influenced by Austen's concept of the "perlocutionary effect" (discussed in 3.2.4). In the 1957 account the M-intended effect of indicative sentences was to bring the hearer to believe something. The revised account refers instead to the effect of bringing the hearer to recognise the speaker's belief. Similarly, the goal of an imperative is no longer to cause the hearer to do something but to cause the hearer to intend to act as directed.

Although Grice attempted to develop his theory of meaning into a semantic theory, this was not successful (Sperber and Wilson 1986:21), and is rarely cited. Further, no link is made between speaker meaning and the linguistic meaning of the utterance (Searle 1969:43). However, his lasting contribution on this aspect of his work is to have established the two key principles that (i) recognition of a speaker's intention is sufficient for communication and (ii) that the onus is on the speaker to provide sufficient evidence of their intention to enable the hearer to construct an appropriate interpretation. These principles form the common basis of the inferential models of

communication (Grice 1975, Sperber and Wilson1986, 1995, Blakemore 1992, Levinson 2000)

The inferential models will be discussed in the main body of this chapter. Logically prior to a discussion of the mechanisms of interpretation is to conclude this general discussion of pragmatic meaning by consideration of speech act theory. As speech act theory, in conjunction with Grice's theory of conversation (3.4), are considered the cornerstones of pragmatic theories of inferential interpretation, and as such are central components of the analytic scheme used in this thesis, both theories will be considered in some detail.

3.2.5. Speech Act Theory

The basic ideas of speech act theory were developed in response to the core issue of accounting for how two sentences that express the same proposition (and therefore share one set of truth conditions), and may even be formally similar, perform different communicative actions when occurring as utterances. Austin (1962) was the first to draw attention to the 'performative' or action-accomplishing use of certain language formulae. He argues that an utterance carries three different aspects of meaning; the propositional meaning of the sentence, the type of action the utterance performs (e.g. to count as a promise, an apology, a command), and the effect the utterance has on the audience, whether intended or not. He called these three aspects the locution, the illocution and the perlocution.

Austin argues that only the locution, that is the sentence with a non-ambiguous determinate meaning, is subject to truth-conditions[1]. The illocution, which is an action performed through language, cannot be either true or false. It can, however, be 'infelicitous', in the sense that the conditions required to authorise the action are not present. For example, a person is christened or married through the ritual act of declaring this action within a specific social and institutional context. Laymen cannot legally perform this action on a whim. A performative utterance accomplishes an action when all the conditions that permit this action to be performed are satisfied. Austin calls these the felicity conditions. Further, most sets of felicity conditions

[1] This position has been disputed. See Geiss 1995:4 for a summary of the argument and references.

include the condition, as an essential requirement, that the speaker's intention be recognised.

Austin's concern was with performative utterances, which constitute a very limited range of the possible types of actions achieved through language. Moreover, Austin's classification of illocutionary acts, which Searle criticises in some detail (1976:7-10), is rudimentary and inconsistent. Searle (1969) developed the theory to cover a far wider range of utterance types. The main focus was the illocution, which he called the illocutionary act or speech act, and the reformulation and development of the theory of felicity conditions.

For Searle the illocutionary act is the basic unit of linguistic communication. Therefore, to clearly distinguish between illocutionary acts and the language used to realize them the twelve significant differentia, which form the basis for his taxonomy, are all social and not linguistic. For example, the three most important (and sufficient) dimensions of difference are given as illocutionary point, direction of fit and expressed psychological state (Searle 1976: 4-5). The taxonomy recognises five fundamental classes of illocutionary act: representative, directive, commissive, expressive and declarative. There is also one important sub-class, representative declarations, which should be included as it carries virtually the same weight as the other classes in Searle's original set of five (Hancher 1979).

1. Representatives commit the speaker (in varying degrees) to the truth of the proposition expressed. The degree of commitment varies from weak cases, such as hypothesising that *p*, to strong cases like asserting, stating or even solemnly swearing that *p*.
2. Directives are attempts (of varying degrees) to get the hearer to do something. Typical examples include suggesting and commanding. Notably, Searle includes questions in this class because "they are attempts to get the hearer to perform a speech act" (Searle 1975: 356).
3. Commisssives are illocutionary acts whose point is to commit the speaker to some future course of action. Strong examples include promising or guaranteeing. Weaker, and probably more usual examples are use of modal 'will'.

4. Expressives convey (sincerely or not) the speaker's psychological attitude to a state of affairs the utterance refers to, or presupposes, but does not explicitly assert. Typical expressives are welcoming, congratulating, condemning.
5. Declarations affect the state of the world through being uttered. Like many of Austin's performatives, a declaration often has a ritualistic aspect and is authorised as action by the social and institutional context in which the utterance occurs. Typical examples include 'I promise'; 'I sentence you to life imprisonment'.
6. Representative declarations are technically a sub-class of declaration. A representative declaration involves a truth-claim, but it functions like a declarative in that the utterance carries absolute force of authority, irrespective of the truth or falsity of the proposition. For instance, if the umpire of a tennis match states the ball was out of court, then it must be treated as so, even if other observers know it was in.

Searle's (1969) speech act structures are the development of the Austinian concept of felicity. Searle argued that speech acts, a term he used in preference to illocutionary act, are subject to four types of felicity condition: propositional content conditions, preparatory conditions, sincerity conditions, and essential conditions. The standard procedure for explaining the felicity conditions is to do so by illustration, through stating the conditions for one type of illocutionary force. For example, Searle's felicity conditions for requests are:

(H is the hearer and S is the speaker)

Propositional content:	Future act A of H.
Preparatory:	H is able to do A.
	S believes H is able to do A.
	It is not obvious to both S and H that H will do A in the normal course of events of his own accord.
Sincerity:	S wants H to do A.
Essential:	Counts as an attempt to get H to do A

Searle (1969:66)

Arriving at an interpretation of the illocutionary force of an utterance involves identifying the type of illocutionary (or speech) act in use and providing a mental representation of a set of felicity conditions, which are satisfied. Further, it is usual in speech act theory to distinguish between direct and indirect speech acts. Direct speech

acts are utterances in which there is a clear form and function correlation. Typically, an illocutionary verb is used to express the illocutionary force of the utterance. Moreover, there is a direct meaning relation between the propositional content of the utterance and the illocutionary force. The illocutionary force expresses an action with reference to the propositional content. In contrast, indirect speech acts display no form-function relationship. Searle (1975) argues that indirect speech acts have a primary illocutionary force, which is the intended meaning, and a secondary illocutionary force, which is the literal meaning of the sentence. The primary illocutionary act is achieved through uttering the secondary act; as in the example;

S: Do you want to come to the cinema?
H: I've got an important exam tomorrow.

How does the hearer derive the speaker's intended meaning, i.e. refusal? In Searle's (1969) original account the hearer's utterance performs the indirect speech act by addressing one or more of the felicity conditions, in this case the preparatory condition of being available to accept, and indicates in doing so that the essential condition is not satisfied. This account, however, assumes congruence between the utterance's propositional content and syntactic form (the literal or secondary meaning) and its indirect meaning (the primary meaning). But when this symmetry does not exist there is an issue of accounting for the status and function of the literal meaning.

One way of dealing with the problem was the proposal (Sadock 1974) that certain syntactic expressions so conventionally convey a specific indirect meaning that they can be treated as idiomatic. This solution bypasses the literal meaning, while still allowing it a role in interpretation. However, true idiomatic expressions do not translate cross-linguistically, whereas the conventionalised syntactic expressions Sadock discusses are translatable. A more serious objection to the idiom theory of indirect speech acts is raised by consideration of expressions that can be used either idiomatically or non-idiomatically. Intended use cannot be determined by form alone, and the account requires an inference theory to enable the hearer to determine an interpretation (Grundy 1995: 99).

Searle's revised account (1975) states that the interpretation of indirect speech acts is performed through an inferential process. The systems, that form an explanatory model of this process, include a theory of speech acts, certain general principles of co-operative conversation (i.e. the maxims of Grice's Co-operative Principle), and mutually shared background information, together with the hearer's ability to make inferences. Although, Searle regards this framework of systems as a sufficient explanation, the question of the conventional association of certain syntactic forms with specific indirect speech acts, as raised by Sadock's idiom theory, needs to be accounted for.

Searle's solution is to recognise that while all indirect speech acts are calculable, not all need to be calculated. This distinguishes a separate category of high frequency speech acts, which are immediately recognisable in context, through use of a form that is so conventionally associated with the act that its literal meaning is totally by-passed. Searle's account differs from Sadock's in avoidance of the notion of idiomatic meaning. He is careful to state that the act can be calculated on the basis of his framework and general rationality. This is not the case with true idioms.

Searle's theory of speech acts is an economical and elegant system, which provides an explicit model of communication. Nevertheless, the major weakness of the theory is the difficulty of arriving at the intended meaning on the basis of the syntax, or literal meaning. Although, Searle attempts to overcome this through combining speech act theory with an inferential procedure, the principles of the theory still allow multiple interpretations of the same utterance (Levinson 1981).

There are two main reasons for this. Firstly, traditional speech act theory gives very little account of context, although context is implicitly an aspect of Searle's inferential framework. Hancher's (1979) classification of co-operative speech acts fails to overcome this difficulty, as the co-operative act is realized as an adjacency pair in a dyadic interaction. It does not span multi-turn or multi-participant interactions, which are typical patterns of many conversations. Secondly, speech act theory accounts for meaning at the level of the sentence, or individual utterance, and not at the level of discourse. As a consequence, the intended meaning of the utterance cannot be related to the wider interpretative framework of the goals of the interaction. Searle does make

an explicit link between the essential condition and speaker's goal, but again this remains at the level of the isolated utterance. Moreover, Searle pays little attention to the effect of the utterance; and thus disregards the potential any utterance has to invoke and change the context.

In contrast, Austin's perlocutionary act, covering effects on the audience, intended or otherwise, gives particular attention to the impact of interpretation. And in respect to analysis of conversation, Geiss (1995:59-66) distinguishes between the transactional effect (information carrying) of an utterance and the interactional effect (social impact). This distinction marks the manner in which an utterance is expressed, reflecting attention to concerns directly related to the wider target of reaching the goal of the interaction.

A further critique of speech act theory is that the theory claims the status of cognitive reality (Sperber and Wilson 1986). It is a matter of belief whether or not speech acts are universal categories of human behaviour, as Searle (1975) claims. However, another level of belief is required to assert that the speech act must be recognised for interpretation to take place. Sperber and Wilson argue the scheme is a system of description, which has no psychological reality. As will be argued in sections 3.5 and 3.6, the argument rests on the place of convention in relating speech acts to syntax.

Summary

Natural verbal communication is not restricted to the use of language to transfer information or propositional content. Nor is it a means of articulating a mental representation. Instead, language is used to achieve interactional and transactional goals. Consequently, meaning is described as the relation of the proposition and the speaker's intention with respect to the goal of the interaction as a whole and with respect to the local management of the conversation, as represented by the adjacent utterances. All of these factors will influence the choice of expression for any utterance. Meaning is therefore correctly regarded as multi-componential.

There are also reasons to believe that the different components that make up a representation of meaning are not modular but interacting. For example, even a basic interpretation relies upon an interaction of the grammar and semantics of the sentence

with pragmatic principles. It has been shown that there are context-variable aspects of meaning, and in particular reference assignment, lexical disambiguation or even the resolution of grammatical categories like anaphora (Levinson 1987), which cannot be derived without the application of Gricean pragmatic principles. These principles involve making inferences from the input data.

There is also an important distinction to be made between direct and indirect meaning, wherein indirect meaning is not derived directly from the linguistic meaning, but is a motivated interpretation of the speaker's intended meaning. The hearer through an inferencing process, which is presumed to be a natural human cognitive ability and a central part of language use and understanding, interprets indirect meaning. Certain constant principles enable and constrain the inferencing process. These include the notion of a common ground (or shared knowledge) between participants, use of general background knowledge, use of knowledge of the language system and of the cues provided within the context of the utterance.

There is, however, disagreement over the mechanisms of the inferential process and the role of the different types of input in reaching an interpretation of meaning. The subject of the next four sections is to discuss and compare the most prominent of the pragmatic, inferential models of communication.

The question that these models seek to answer is how the hearer is able to infer just the meaning intended by the speaker. Similarly, the aim of this thesis is to develop a framework, based on pragmatic theory, which arrives at a linguistically motivated interpretation of speaker meaning. Inevitably, pragmatic theory dictates that the inferences are drawn from the context of the utterance. However, this raises the issue of how context is to be defined. It also raises the issue of providing an explanation for the selection of a unique context from the range of possible contexts that the utterance can be interpreted in.

The discussion is structured across four sub-sections, covering the four major theories. In the next section the idea that inference is a product of mutual knowledge is considered through a discussion of the mutual knowledge hypothesis. This is the position taken by some psychologists studying how interlocutors achieve common

ground. The following section examines Grice's theory of conversation, which is generally regarded as one of the cornerstones of pragmatic theory. Relevance theory and the theory of generalised conversational implicature, which are the more recent developments of Grice's theory, are considered in sections 3.5 and 3.6.

3.3. THE MUTUAL KNOWLEDGE HYPOTHESIS

The mutual knowledge hypothesis is that a speaker and hearer will achieve a common understanding if the context envisaged by the speaker is exactly the same as the context the hearer uses to interpret the utterance. This entails that the participants in the conversation share all the assumptions that might be related to the utterance. Further, to satisfy the notion of mutual knowledge they should also both know that they share these assumptions and both know that they know that they share the same assumptions, and so on through an almost infinite regression of assumptions of shared knowledge states (Lewis 1969, Schiffer 1972).

The hypothesis in its strong form is obviously untenable. Firstly, any proof of a premise that is based upon an infinite regression of lower order states is self-defeating. At what point can you say something is mutually known? Further, in this case, even the highest order assumption, that there is such a thing as mutual knowledge, has very little probability. By definition, if there were mutual knowledge then it would be mutually known, and not just assumed. Secondly, the notion of participants sharing mirror-image mental representations of the utterance fails to provide an account for ambiguity. More recent studies of verbal communication from a diversity of fields, including the work in Artificial Intelligence on Parallel Distributed Processing (McClelland et al 1986), discourse theory (e.g. Widdowson 1990) recognise not only that much of our talk is underdetermined (Blakemore 1992), but that meanings are often determined through constrained creative hypothesis-formation.

The mutual knowledge hypothesis needs to be expressed as a requirement for mutual probabilistic assumptions, and it will be used with this sense from this point on. Clark and Marshall (1981) state a speaker and hearer can assume mutual knowledge of a proposition (or set of propositions) if they are both present in a situation that provides

evidence for the proposition. They do point out that the strength of the evidence varies with the type of input. They regard physical co-presence as providing the strongest grounds for an assumption of mutual knowledge, with linguistic co-presence (oral or textual) providing less direct evidence. Membership of a community predicts access to all the propositions shared by its members, but does not predict whether the hearer has this knowledge. It is therefore a variable measure, dependent upon other types of information to provide it with a value.

On Clark and Marshall's account the description of the input they propose as evidence is a description of context. Context is being treated as an external reality. It is also treated as strictly finite, in fact limited to certain quite broad categories of input. There are two major difficulties with this treatment. Firstly, how can we know that those aspects of context Clarke and Marshall discuss are those that are used in utterance interpretation? Their description lacks an account of saliency of input. Secondly, even physical co-presence at memorable events does not guarantee that individuals represent the event in the same way (Sperber and Wilson 1986:19). There is therefore a difficulty in treating an external context as if it could be directly transferred to a cognitive unit, mentally represented in full and unchangeable in memory.

Blakemore (1992) questions the role of mutual knowledge in verbal communication. Her point is that it is unclear to what extent we need to establish that mutual assumptions exist for understanding to occur. Even Clark and Marshall's account requires the hearer to fill in a number of auxiliary assumptions, which rely for their validity on other sets of assumptions. At what point is there sufficient probability of mutuality to proceed? Her second argument against the mutual knowledge hypothesis is that in actual conversation, where misunderstanding occurs, the participants use various forms of repair strategies. Moreover, they do not attempt to repair the mutual knowledge state, but have the goal of effecting repair of a very local understanding. The aim is to establish the correct assumption in order to continue their talk, not to diagnose the areas of difference between speaker and hearer

Clark and Schaefer (1989) address the need to account for the selection of the input, which serves as evidence for mutual knowledge. They propose that the common ground of mutual understandings, beliefs and so on, is augmented and maintained by

a process they call "grounding". The grounding process involves obtaining feedback (or checks on understanding) and offering or seeking repairs in order to establish that a common ground is being maintained. Nevertheless, as Blakemore has pointed out, the cycle of checking mutual knowledge must be constrained. Clarke and Schaefer' s response is to propose participants need merely attain the "grounding criterion".

> "The contributor and the partners mutually believe that the partners have understood what the contributor meant to a criterion sufficient for the current purpose."
> (Clark and Schaefer 1989: 262)

What counts as sufficient varies with the nature of the task and the goals of the interaction. One application of this model (Baker, Hansen, Joiner and Traum 1999) used the grounding criterion as a threshold level to analyse student interaction in computer-mediated collaborative learning tasks (CSCL). The study concludes that what may count as sufficient, even within the same situation, varies constantly in relation to the learners' local goals. Learners are prepared to expend effort to reach mutual understanding if the goals of the situation demand it. If attaining mutual understanding, either with the learning partner or with the learning materials is not needed to perform the task, sufficient grounding means a more approximate level of understanding.

The grounding criterion certainly expresses a common-sense truth. However, it is a very general truth, which relates to the role of motivation and goal achievement in understanding. It does not address the general mechanisms or procedures used to attain joint understanding, which is the focus of this research. Further, Baker et al predict different grounding procedures for different media. I would argue, that such a prediction begs the questions, which this research attempts to consider, and which their own paper has not sufficiently addressed through the application of a very broad conversational principle.

3. 4. GRICE'S THEORY OF CONVERSATIONAL IMPLICATURE

Grice's (1975) theory of conversation is the development of the notion of non-natural meaning (meaning nn) (discussed in 3.2.2) into a fuller theory of communication as an inferential process.

According to Grice's theory the Co-operative Principle is the guiding principle that governs talk. Knowing the principle and the constraints it sets for managing conversation enables the addressee to draw inferences as to the intended meaning of the utterance. The Co-operative Principle is:

> Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk in which you are engaged.

Within this Principle, Grice suggested four maxims:

> **Quantity**
> (i) Make your contribution as informative as required (for the current purposes of the exchange).
> (ii) Do not make your contribution more informative than is required.
> **Quality:** Try to make your contribution one that is true.
> (i) Do not say what you believe to be false.
> (ii) Do not say that for which you lack adequate evidence.
> **Relation:** Be relevant.
> **Manner:** Be perspicuous.
> (i) Avoid obscurity of expression.
> (ii) Avoid ambiguity.
> (iii) Be brief (avoid unnecessary prolixity).
> (iv) Be orderly.

In this theory the prototypical way of conducting a conversation is to proceed on the mutual assumption that the maxims of the Co-operative Principle are being followed. However, the prototypical way of conveying implicit meaning is to intentionally fail to abide by the maxims. Grice calls this conversational strategy "flouting the maxims". The addressee assumes on the basis of the Co-operative Principle that the flout is intentional, and seeks to recover the meaning conveyed. In fact, whenever a maxim is flouted there must be an implicature to save the utterance from being a faulty contribution to the conversation.

An implicature is always a non-natural meaning and arises within a context of use as a result of the interlocutors' mutual knowledge of the Co-operative Principle and other aspects of shared background knowledge. An implicature is the result of an inductive inference as to what is the most likely co-operative interpretation in the context. It can therefore be cancelled or modified if contradictory or supplementary premises are added to the context. This contrasts with an entailment, or conventional meaning, which is an aspect of the semantic meaning of the utterance and occurs independently of context. An entailment is natural meaning and cannot be cancelled without contradiction.

Grice formalises this distinction into a simple scheme (see Figure 3.1) whereby what is conveyed by an utterance consists of what is said or entailed on the one hand and what is conversationally implicated on the other hand. The conversational branch of the scheme is then sub-divided into a further distinction between 'generalized' and 'particularized' conversational implicatures.

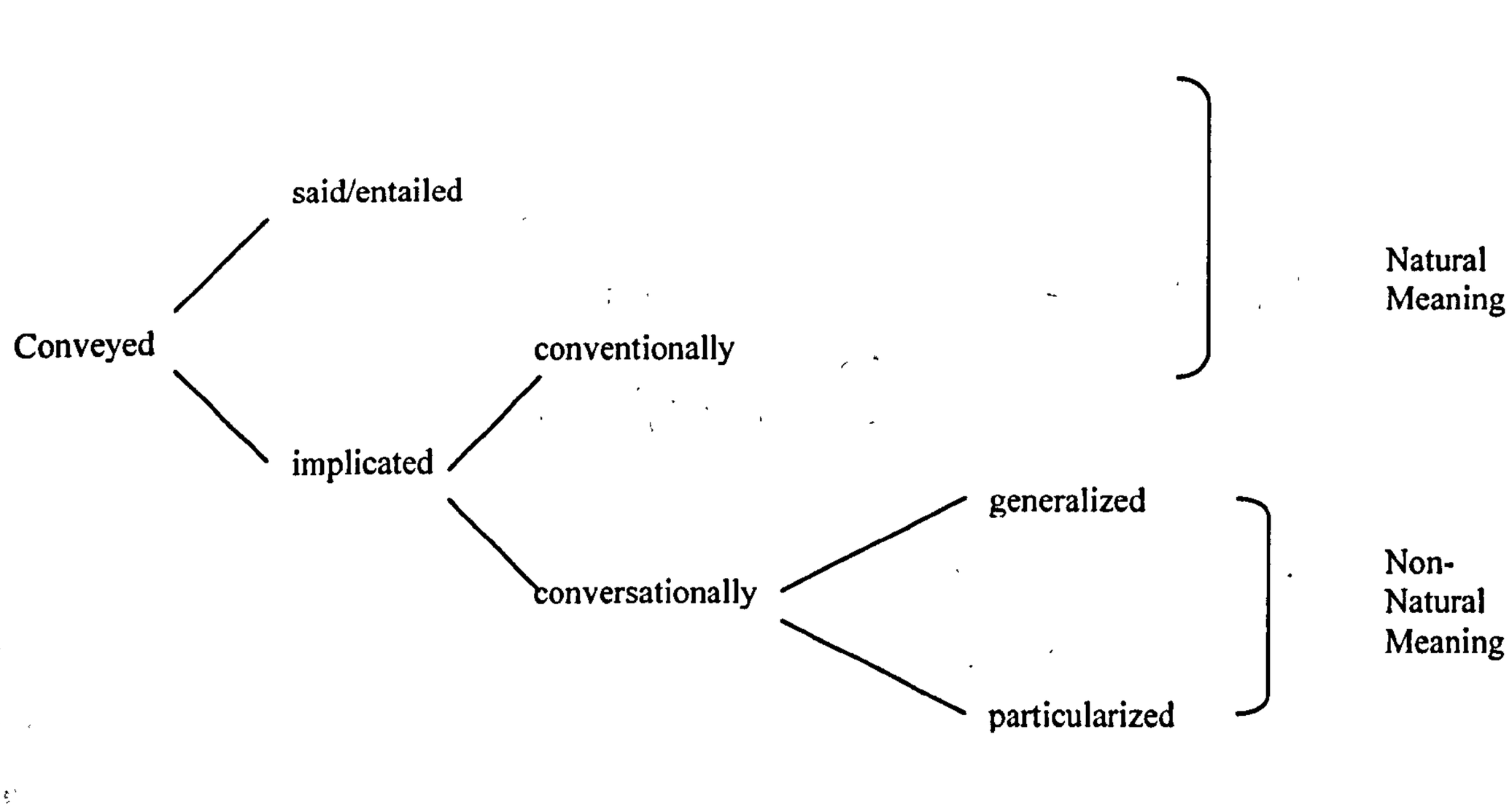


Figure 3.1: Grice's categories of meaning.

A generalized conversational implicature (GCI) arises from the conventional associations of the utterance, irrespective of the context in which it occurs, and so the

inferences a GCI gives rise to will be the same whatever the context. Nevertheless, although a GCI is a conventional reading generated from the utterance alone, its intended effect is determined with reference to the manner and purpose of use on a specific occasion. Moreover, a GCI is a pragmatic unit, as it can be used in contexts that either disallow the implicature or dynamically cause it to be modified. In contrast, particularized conversational implicatures (PCIs) are derived not from the utterance alone but from the utterance in context. A PCI is the prototypical pragmatic unit since different implicatures may be derived from the use of the same linguistic string in different contexts. The issue is to determine the most relevant interpretation of the utterance in its particular context. As a result all PCIs are generated and interpreted through the maxim of Relation (or relevance) and are calculable only with reference to an instance of use.

The GCI and PCI categories are by definition inferred through applying the maxims of the Co-operative Principle. Furthermore, the conversational implicatures have the property of cancellability, which sets them far apart from entailments. However, Grice recognises a third category of implicature (conventional implicature) that spans the divide between implicature and entailment. This category is realized in a small set of lexical items, including 'even', 'but', 'still', 'yet', 'actually', 'well', that usually function in the sentence as adverbial modifiers. They are treated as cases of implicature since they carry an additional implied meaning, which does not add to the truth-value of the utterance. For example, 'but' entails conjunction and implies contrast. At the same time, Grice argues the category must be treated as conventional, and not conversational, since the implicature is not inferred using the Co-operative Principle or other rules of talk.

The category of conventional implicature has a relatively minor role within Grice's scheme as whole. However, it takes on a much greater significance in consideration of its relationship to the two conversational implicature categories. Specifically, the existence of this category raises questions over Grice's explanation of conversational implicature, and of GCI in particular. Firstly, what is the justification for the GCI category? Why isn't there just a binary distinction between conventional and particularized implicature? Secondly, some conventional implicatures can so frequently co-occur with the words they are associated with, that cancellation,

although technically possible, can become awkward and unnatural (Grundy 1995:48). Is there then simply a scale of frequency that represents the extent to which meanings are conventionalised, so that very high frequency associations are treated as entailments? If this is so, then the distinction between natural and non-natural meaning is diminished, and other criteria must be provided to reinforce the distinction. Thirdly, what justification is there to assume the existence of the maxims of the Co-operative Principle or their role in inferring meaning? These issues will now be addressed in the evaluation of Grice's theory.

Is Grice's explanation, which is at the heart of pragmatic method, acceptable? I will attempt to address this question, and the three issues raised in the paragraph above, by putting under scrutiny the notion of implicature and the validity of the conversational rules. As the GCI category is the central topic in the differences between the London School of Relevance and the neo-Griceans, it is the subject of extended, focused discussion and evaluation in the next two sections.

According to Grice, an implicature has the following properties:

(i) An implicature is worked out on the basis of conversational rules.

(ii) An implicature is calculable in relation to its context.

(iii) An implicature is derived from form but is not invariably associated with particular syntactic strings or lexical items.

(iv) An implicature does not contribute to truth-conditional meaning, and can be cancelled without contradiction by adding a clause to the sentence.

Grice also proposes six tests for conversational implicature, which closely resemble the properties listed above. Grice's aim is to make a clear distinction between conversational implicature and conventional meaning, and this may help to clarify the difference between the conventional implicature and GCI categories. However, it is unlikely that a clear threshold can be drawn between conventional and non-conventional meaning. Sadock's (1978) critique of the tests shows that if they are examined *a priori*, only three can be applied. And when applied in isolation of context, all but the test of cancellability fail to generate significant results.

Moreover, applying the cancellability criterion to highly generalized associations, like the test-case word 'almost' (Sadock 1981)[2] shows that the stronger the conventional association the harder it is to cancel without breaching logical semantic principles. A further weakness in the cancellability criterion is that it fails to distinguish cases of grammatical ambiguity from possible conversational implicature. Sadock's (1978) argument states that the words 'and' and 'or', which are unequivocal as logical operators, are grammatically ambiguous. 'And' can be used with temporal overtones, to mean "and then" or "at the same time". 'Or' can be used exclusively (one of the alternatives but not both) and inclusively (both alternatives apply). It is possible to argue that these additional meanings are cases of conversational implicature. It is also possible to argue they are grammatical and semantically determined using broad pragmatic principles of disambiguation. These arguments raise problems for the GCI category, wherein meanings are worked out with little reference to the immediate context of use. The arguments also show that it is almost impossible to draw a clear line of division between conventional and non-conventional meaning.

However, it is trivially true that there is no clear distinction between conventional and non-conventional meanings. There cannot be a threshold, as there is a constant movement from the non-conventional to the conventional (Lakoff and Johnson 1980, Morgan 1991, Sadock 1978). Moreover, Grice's three categories of implicature indicate recognition of the continuum between conventional and particularized usage. The issue here is to determine the extent to which Sadock's criticisms undermine the theory of implicature.

Nunberg (1981) argues Sadock's methodology is inappropriate to the task. Sadock's error is to apply the standard methods for generative grammar to investigate pragmatic principles. This is the wrong tool for the job. If the job is to recover pragmatic information, it fails to take account of context and the conversational rules, which are the keystones of Grice's theory, and provides information disproportionately on the dimensions of grammar and semantics. On Sadock's methodology, the tests for implicature are almost bound to prove unworkable. On a Gricean methodology, they are more likely to be useful.

---

[2] almost is so highly conventionally associated with [~not p] that it might be considered an entailment of almost. But this additional sense can be cancelled without contradiction in certain circumstances.

The basic Gricean method can be simply stated. It relies upon the standard use/usage distinction; i.e. the difference between explaining the meaning of a sentence and the frequency and circumstances of its use. A pragmatic explanation of an expression begins by specifying the conventional use of the sentence. It then specifies the use to be explained through disambiguation of references and consideration of the relevant features of context. This generates a set of possible inferences. The hearer then seeks a particular interpretation that is consistent with the Co-operative Principle and the conversational maxims. If the meaning is an implicature, it will be recovered through the assumption that the maxims are being deliberately flouted.

Grice's method allows us to rescue the calculability test for implicature, cast aside by Sadock's analysis, and to provide an argument in favour of the GCI category. Sadock argues the criterion of calculability is trivially true of all expressions and cites the conventionalised use of idioms and euphemisms to support his case. However, there is a distinction between providing a rationale for an expression and explaining its interactional effects in use (Nunberg 1981). Grice's explanation of the criterion specifies the implicature is calculable in context. The calculation (Grice 1967a: 50) is based on five types of data:

(i) Knowledge of the conventional meanings and the identity of the references
(ii) Knowledge of the conversational postulates
(iii) The context, linguistic or otherwise, of the utterance
(iv) Other items of background knowledge
(v) The fact that all of this can be presupposed by all the participants in the conversation

There are clearly problems with the vagueness of this formula, and particularly with the vagueness of dimensions (iii) and (iv). If dimensions (iii), (iv) and (v) are taken as the definition of context, then everything which is known in common is potentially relevant to the interpretation of meaning. By the principle of economy of effort, this cannot be so. What is needed is an explanation of how and why certain features of the context become salient. Nevertheless, it is an explicit statement of the parameters used to calculate implicatures, even if some aspects of the process are not adequately accounted for. It therefore rescues the calculability test.

However, the fact that an implicature can be calculated does not imply it need be calculated. There is no reason to assume a hearer recalculates an implicature, on repeated use of a form in similar circumstances. Previous experience acts as a guide to what Morgan (1991) calls "short-circuited implicatures". Nor, can highly conventionalised use of certain expressions be assumed to cancel the implicatures carried or the co-ordination gaps if the hearer does not recover these meanings. For example, Morgan treats pragmatic uses of 'allusions', like "I want to be alone" or "spin-doctors", as conventional forms. However, as Nunberg (1981) points out, these types of expression still carry the presupposition of a reference to the original context of use. When the association with the original context no longer motivates use of the expression, then it is conventional. Until then, the implicature is conversational and falls into the GCI category.

This discussion shows that Grice's notion of implicature can be defended, although weaknesses are noted in the failure to properly define context. Moreover, although the GCI category is the most powerful category in the scheme, since it involves interaction between conventionally presupposed linguistic and non-linguistic knowledge, the definition is vague and inadequate. One minor argument in support of GCI has been presented here, but a proper discussion of its validity and application will be developed as the argument of the chapter progresses. The next stage of this evaluation of general Gricean theory considers the role and importance of the conversational maxims in interpreting speaker meaning.

The first criterion of validity the maxims must satisfy is that they have a psychological reality as basic principles of conversation. Evidence should be available in the grammar. In fact, three types of data can be found in the grammar to support Grice's account of the maxims. Firstly, in English the use of metalingual hedging expressions to modify strict adherence to the maxims (Grundy 1995:41) or to mark non-observance (Thomas 1995:75) is widespread, and evidence can be found for all the maxims. Secondly, the maxim of Quantity is encoded in the grammar through the principle of scalar implicature (Gazdar 1979) (for a detailed explanation see 3.5.2). The maxim of Relation is also supposed to be always in operation, else the meaning retrieved is unlikely to be coherent within the discourse. Thirdly, these pragmatic categories can explain a lexical gap, created by the lack of direct equivalents in

natural language to certain logical values. Horn (1972) noted that while the existential quantifier of formal logic, and its negation, are represented in the natural language of English through the lexical items 'a', 'some' and 'none', there is no negation of the universal quantifier 'all' in natural language. Instead, this meaning is carried as a Quantity-based implicature of 'some'. Grundy (1995:65) provides a list of additional examples of the same phenomenon. The importance of the observation is that is that it shows that a conversational maxim has determined what is lexicalised.

A second criterion of validity is that the maxims (or some rules of conversation) are necessary to co-ordinated talk, and cannot be replaced by a rule of grammar. Although attempts have been made to formalise the pragmatic constraints, through for example modification of the Gricean maxims (Gazdar 1979) or modification of speech act theory (Geiss 1995), movements in this direction tend to override or neglect the phenomenon of ambiguity. Moreover, the strength of pragmatic theory is that it is able to explain the occurrence of ambiguity and degrees of understanding and misunderstanding. Overall the principles are accepted as broadly explanatory, if inadequate for some (e.g. Blakemore 1992, Thomas 1995, Sperber and Wilson 1986). The remaining questions over the validity of Grice's theory address the issues of whether the number and definition of the maxims proposed is appropriate and whether the explanation of non-observance is sufficient.

Various attempts have been made to modify Grice's maxims to correct the vagueness of the original formulation. Some have argued that three is a correct number (e.g. Atlas and Levinson 1981). This argument is based upon the overlap between the maxims of Quantity and Manner. Often it is difficult to determine which of the maxims is invoked in a stretch of talk; and the sub-maxims can only discriminate in a small proportion of cases (Thomas 1995). In contrast, Grundy (1995:56) suggests an increase to five to include a maxim of involvement for the expression of personal opinions. However, reducing or increasing the number of maxims by one basically accepts the framework but attempts to improve on the rigour with which the maxims discriminate.

A more powerful argument to refine the application of Grice's scheme is to take into account that the maxims are not universal principles, but are culturally and context-

specific. Not all cultural groups observe all the maxims, and cultures also vary in the extent to which the maxims are normally expected to be observed. Differences in the extent of observance can also be found even within the English-speaking world. Moreover, even within a relatively unified culture of social institutions (such as exists in the UK), the degree to which the maxims are observed varies with the activity type and social setting (Levinson 1979). For example, exchanges within a court of law must observe the maxims of Quantity and Quality more rigorously than exchanges made in the course of a seminar (Thomas 1995). There are also occasions when deliberately suspending observance of these maxims contributes to the communicative act, when telling jokes or writing obituaries for instance. Knowledge of the extent to which the maxims should apply within different activity types and of the pragmatic use of deliberate suspension forms part of our socio-cultural knowledge. In co-ordinating everyday talk, this knowledge is presupposed as common ground. Where participants are inducted to a new activity type, which has a specific set of conversational requirements, the rules of the activity are made explicit.

The principle of suspension is important for those who make a radical departure from the Gricean scheme and argue the conversational maxims can be reduced to one, the maxim of Relation. The argument rests on the fact that this maxim can never be suspended. Nor can the maxim be adequately subsumed under Grice's overarching principle of "Be perspicuous". In contrast, Sperber and Wilson (1986, 1995) argue that the three other maxims can be subsumed under a fully developed maxim of Relation. This is the basis of Relevance theory, which will be considered in depth in the next section. Further, as the positions of the neo-Gricean school and the school of Relevance theory are so polarised on this issue, the question over the number of maxims is partly determined in the higher-level decision between the theories.

The last aspect of Grice's theory to be considered is whether or not the explanation of flouting the maxims is adequate. Flouting the maxims is only one type of non-observance, among the four different types that Grice mentions. However, it is the category Grice is most concerned with, as the blatant non-observance is what creates the communicative effect, i.e. the implicature. However, the hearer must recognise the speaker's intention in order to understand that the maxim is being flouted. Without understanding the intention the hearer has no means to know whether the non-

observance is communicative or not. Furthermore, there can be no means to choose between a range of possible implicatures generated by the utterance and no means to distinguish intentional meanings from unforeseen by-products. In short, Grice's explanation lacks an account of intentionality, although this is central to the idea of flouting. An account of how saliency is negotiated in the exchange is also needed. What does the hearer pay attention to and how does the speaker control this?

Summary and Conclusion

To sum up, Grice provides us with the valuable principle of deviance from a norm as communicative, and the invaluable concept of communication achieved through co-ordinated action, governed by mutually known (and presupposed) maxims. But he has not provided a fully developed account of the theory, which can be applied. This has left it open to two schools of thought to develop the field he has created. One school of thought, represented most dominantly by the proponents of Relevance theory, recognise only two levels of meaning: sentence meaning and speaker-meaning. On this account all kinds of implicature are explained as nonce[3] inferences, one-off inferences to a specific speaker meaning given the full body of assumptions held by the participants on that occasion. The other school of thought has developed Grice's concept of GCI and recognises three levels of meaning: sentence meaning, utterance meaning and speaker-meaning. On this account GCIs form a set of default or preferred implicatures, which are part of our system knowledge and do not need to be calculated within a particular context of use. Although the two schools perceive their approach as fundamentally opposed, the theories have been developed in parallel and are inevitably mutually informing. Moreover, each school is the main and best critic of the other. Ironically then, the evaluation of Relevance theory relies heavily on an intensive discussion of GCI, just as the main points of criticism and constructive feedback on Levinson's GCI are from the School of Relevance.

3.5. RELEVANCE THEORY

The theory of Relevance (Sperber and Wilson 1986, 1995) is the most prominent and prevalent of the nonce-theories, and it also represents a radical departure from

[3] The term 'nonce' is borrowed from Levinson's use (2000). It means that indirect meaning is calculated on a one-off basis within a particular context.

Gricean theories of co-operative co-ordination. The theory takes as its point of departure the maxim of Relation, which in Grice's original version is undefined, and develops this into a general cognitive principle. The theory is not empirically based, but has proven explanatory in the analysis of naturally occurring data (e.g. Grundy 2000:111-115, Blakemore 1992).

My argument in this section will show that in this model certain stages of the inferential process rely irrevocably on creative hypothesis generation, and are not strictly guided by logical principles, as the theory claims. It is also argued that the model does not present a sufficient challenge to the Gricean concept of operative principles governing communication. Nevertheless, Relevance theory has contributed significantly to our understanding of pragmatic principles. In particular, the theory provides an explanation for different degrees of understanding, and it provides a highly satisfactory definition of context as a psychological domain of presupposition and schematic knowledge. We also owe to Sperber and Wilson the insight that when language is used for communication, pragmatic inferences are required to determine even apparently invariant elements of meaning such as the sense of a lexical item. The aim of this section of the chapter is to assess the strengths and weaknesses of the theory and to arrive at some conclusions as to which aspects can and should be incorporated in the analytic framework developed in this thesis.

3.5.1 Relevance Theory

The theory states that we make an interpretation of a speaker meaning through processing the effect of the interaction of the new input with sets of assumptions already stored in memory. This interaction forms what Sperber and Wilson call a contextual effect. The main idea behind the notion of the contextual effect is that the interaction of old and new information will modify the context, where context is defined as a psychological construct. At large, it is derived from all the assumptions and sub-sets of assumptions that form an individual's encyclopaedic and experiential knowledge of the world. This knowledge is inevitably partly idiosyncratic and partly conventionalised. So, the context for a specific utterance on a particular occasion is made up of all the presuppositions that are assumed to be shared by the participants in the interaction. If formed, a contextual effect modifies the context in one of three ways:

(i.) It may contradict an existing assumption. If the evidence for the contradiction is not compelling then the hearer retains the proposition with a lower degree of conviction.

(ii.) If the contextual effect provides compelling evidence to contradict an existing belief, then the proposition will be abandoned.

(iii.) The contextual effect may form a new premise that will give rise to a new contextual implication[4].

When the meaning of an utterance has a contextual effect then Sperber and Wilson say it is relevant in that context. Obviously, the processing could continue indefinitely. The theory claims processing ends when the value of the contextual effect no longer exceeds the effort required to derive it. A proposition that provides maximal information value for the minimal processing effort is described as having optimal relevance. The principle which gives rise to the presumption of optimal relevance is the Relevance Principle.

$$\text{Relevance} = \frac{E \text{ (number of contextual effects)}}{C \text{ (cost of effort in obtaining E)}}$$

Levinson (1989)

As Sperber and Wilson are only interested in intentional acts of communication, the onus is placed on the speaker to bring the hearer to interpret the utterance as intended. To achieve this goal the speaker needs to make judgements about the hearer's context and cognitive abilities, and to estimate which presuppositions are likely to be shared. The speaker then decides on the extent to which they need to constrain the way in which the message can be interpreted. This can be done in one of two ways. One is to make the intended message explicit through linguistic means, such as use of discourse markers, or conventionalised forms. The other is to exploit the presumption of relevance, i.e. the presumption of maximum informational richness for low processing costs. This explains how a highly implicit (indirect) meaning might be the only possible interpretation in a given context. If the speaker does not attempt to constrain

[4] a contextual implication is broadly equivalent to Grice's implicature.

the interpretation, this marks the presumption that the hearer has the resources available to recover the intended meaning.

Moreover, the hearer may not have the opportunity to process the input properly. Different channels of communication provide different levels of access to the input data, and require different levels of processing effort. Although the most accessible interpretation is the most relevant, it is only relevant insofar as it requires least processing effort. Where the channel potentially obstructs the clarity of communication, emphasis is placed on how to constrain the possible interpretations to produce the one intended. Lack of opportunity to process the input may also occur through lack of schematic resources or insufficient contextual information. The latter property can be exploited to make "garden-path" utterances, where the speaker deliberately encourages the audience to reach a plausible interpretation, but one that is actually not appropriate to a proper understanding of the full context. This strategy is very common in jokes, where much of the meaning is conveyed implicitly. The humour often comes from the audience forming one interpretation through inference and then having this explicitly contradicted.

The mechanism proposed as underlying the inference process is deductive reasoning. In contrast to Grice's scheme, which proposes a binary division between direct and indirect (or implicated) meaning, the Relevance theory school propose a three level system of interpretation. The first level is "explicature", which is the logical procedure of "fleshing out" the proposition of the utterance through logico-semantic computations over the syntax. Explicature is distinguished from "implicature", which is inferred meaning. Implicature is further divided into an implicated premise and implicated conclusion. The relationship between the categories is linear and hierarchical. Movement from one level to another is achieved through inferences derived through deduction in accordance with the Relevance Principle. Where possible conflicts of interpretation arise, the strongest deduction as determined by the Relevance Principle, is taken as the unique, optimal interpretation.

In summary, the basic core of Relevance theory rests upon three features:

1. The notion of implicature is redefined, and the notion of explicature is introduced.

2. The operation of the maxims is replaced by a context-dependent, inferential process driven by deductive logic and creative hypothesis-formation in accordance with the Relevance Principle.
3. This inferential process is procedural and non-representational. It relies on the single Relevance Principle and not on multiple interacting cognitive principles.

These features characterise the development of Grice's work undertaken by those working within the traditions of the London School of Relevance. They also make up the core of the conflict between this school and the work of the neo-Griceans (Atlas and Levinson 1981, Levinson 1987, 2000, Horn 1984, 1985) (see section 3.6). For these reasons, my assessment of Relevance theory will be made on the basis of the three features.

The first step towards understanding how the school of Relevance defines implicature, is to examine the notion of explicature. Explicature is described as the process that produces a full truth-conditional representation of the proposition (Blakemore 1992, Carston 1991,1995, Sperber and Wilson 1986: 183-185). This process is described as achieved through the interaction of two procedures. One procedure makes explicit the logical relations encoded in the syntax, including entailments and presuppositions. The second is the pragmatic procedure of narrowing down the possible range of interpretations to provide a fully truth-conditional proposition. This involves reference assignment, disambiguation and enrichment. Enrichment takes place when the gap between propositional form and semantic representation cannot be closed by reference assignment and disambiguation alone. This is an inferential task, which Blakemore describes as involving the sub-tasks of making bridging assumptions (Clark and Haviland 1977), interpreting the communicative act and drawing out any indirect meanings conventionally motivated by the context of use. Again the pragmatic principle that motivates the enrichment, and thus creates the premise on which the deduction is based, is motivated not by general operative principles (such as maxims or heuristics) but by the Relevance Principle.

Explicature necessarily includes pragmatic enrichment over and above disambiguation and reference assignment, and therefore intrudes into pragmatic

domains which in Grice's original scheme are represented as the conventional implicature categories: i.e. conventional implicature and generalised conversational implicature (GCI)[5]. Carston (1991, 1995) argues that the GCI category is redundant, on the grounds that interpretation of conventionalised indirect meaning constitutes part of the enrichment process in deriving the explicature (or what is said). The examples below illustrate the point being made.

(a) John is a poet and a philosopher

"and" conventionally suggests he is both.

Explicature= John is both a poet and a philosopher at the same time.

(b) John is a poet or a philosopher

"or" conventionally suggests the speaker is unsure which.

Explicature= John is either a poet or a philosopher, but not both.

A further base of this argument is that even apparently highly conventionalised pragmatic meanings require context-dependent disambiguation (Hirschberg 1985). In particular, Carston cites the multiple meanings of "and", which include simple conjunction, temporal meanings (e.g. co-temporality, succession) and the relation of causality.

The redefinition of implicature therefore rests on these arguments. Grice and the neo-Griceans treat any indirect meaning that is defeasible as implicature. Consequently, it is important for them to define defeasibility. In contrast, Relevance theorists restrict the term 'implicature' to the conclusions that are logically derived from the explicature by deductive reasoning. In the Relevance scheme defeasibility has no special status in describing implicatures. It is simply a product of residual ambiguity and a property of the explicature, which is inherited by the implicature. Further clarification of the distinction comes from Carston's (1991) criterion of the functional independence of the explicature and the implicature. The criterion states that if the explicit content is entailed within the implicature (as is usually the case on Gricean models) then the explicit content is made redundant. The implicature must express a

[5] The GCI category comprises sets of default or preferred, indirect meanings associated in a context-independent manner with specific expressions

proposition or perform a speech act that is quite separate from the fully fleshed-out content.

Is this just a question of disagreement over terminology or does the drawing of boundaries differently affect the proposed theories of meaning and utterance interpretation significantly? As the main bone of contention is the description of explicature and the explanations of how the explicature is determined, much relies upon whether the GCI category can be shown to be a viable independent category. If a sufficient argument can be presented for this category then the arguments that the derivation of *all* pragmatic meaning is context-dependent and calculated by a maxim of Relation will be shown to be wrong. Further, if the GCI can be shown to be valid, then there are arguments for a type of implicature that is not of the type described by Relevance theorists. Thus, the procedure for assessing the Relevance school notions of implicature and explicature will be to examine the viability of the GCI category.

3.5.2 A Counter Argument to Relevance Theory

The test for viability of the GCI category is to establish whether there are sets of linguistic expressions at the level of utterance type, for which default meanings can be generated on the basis of form and irrespective of context. A second test is to consider the extent to which this category has explanatory power for linguistic issues (Levinson 2000).

Firstly, there is some evidence, through the classic principle of scalar quantity implicature (Gazdar 1979), which strongly suggests that generalised conversational implicatures (GCIs) interact with language structure. Gazdar's work on scalar implicature and Horn's entailment scales are based upon linguistic scales, which are arranged in a linear order by their degree of informativeness or semantic strength. The items on the scale are paradigmatic alternates, and the argument is that the use of a lower ranking item on the scale automatically gives rise to the inference that a higher-ranking or semantically stronger alternate would be inappropriate and incorrect.

Gazdar distinguishes two classes of implicature arising from different expression-types: scalar implicature and clausal implicature. Scalar implicatures are motivated by

the quantity maxim. They are induced from ranked sets of alternates, typically quantifiers or scalar adjectives:

<all, most, many, some>
< great, good, okay>

Thus use of the adjective "good" implies by contrast [not great]. Use of the quantifier "most" implies [not all]. As the inference is derived through the Quantity maxim, it also strongly carries the suggestion that the speaker knows that the higher-ranking alternate is not true. That is, a secondary default inference is epistemic certainty.

Clausal implicatures are induced from the contrast between an assumed sentence frame S1 that entails its embedded sentence and another sentence frame S2, which is an alternative expression of roughly the same brevity, but which neither entails nor presupposes the same embedded sentence. S2 sentence types give rise to the inference that the speaker does not know whether the embedded proposition obtains or not. So, clausal implicatures indicate epistemic uncertainty about the truth of the embedded sentence, and carry no indications about the speaker's commitment to a negation of other items in the matrix, as scalar implicatures do. Sentence constructions that typically give rise to clausal implicature are disjunction and conditional sentences.

CLAUSAL IMPLICATURE: P does not entail Q	**STRONGER ALTERNATE: P does entail Q**
P or q	P and Q
If p then q	Since p then q

The implicature rests upon salient contrasts between <since, if> and <and, or>, which form ranked scales. Once this principle is accepted then it can be generalised to all cases of embedded constructions where a stronger and weaker version are available. For example, the relevant classes of verbs include verbs of propositional attitude and most verbs of saying (except ask and tell) (see Levinson 1983: chapter 3).

The most substantive criticism of Gazdar's work on scalar implicature addresses the lack of clarity over the epistemic character of these default inferences. Gazdar claims that there is a strong epistemic commitment by the speaker to negate all the items on the scale above the asserted one. Many consider this position too strong to hold. Horn (1989) proposes retaining Hintakka's operator, which Gazdar's calculations are based on, but altering the epistemic force of scalar implicatures to epistemic uncertainty. On this approach, "some came" carries the generalised implication that the speaker does not know whether all came or not. Hirschberg (1985) regards all implicatures as carrying epistemic uncertainty.

It is therefore reasonable to question why Gazdar adopts the strong position. The answer is that only the strong position is compatible with his mechanism for solving the Projection Problem [6] (see 3.6.1). Gazdar's (1979:130) solution is to propose a hierarchical scale of pragmatic meaning in which higher-ranking items cancel out those at lower levels. On this scale, clausal implicatures cancel out scalar implicatures. However, Gazdar's solution to the Projection problem is not without issues (see: Levinson 2000:163), and largely because the filtering system cannot deal with the attested phenomenon of implicature cancellation at an arbitrary distance.

Horn's (1972, 1989) entailment scales attract a different branch of criticism. The entailment scales describe the principle that, where there is an ordered set of n-tuple expressions which are paradigmatic alternatives (xa… xb….xc…xn), when used in an arbitrary sentence frame S(xa) will unilaterally entail S(xb). Sample Horn scales include:

Quantifiers	<all, most, many, some>
Connectives	<and, or>
Modals	<necessary, possible>
	<must, should, may>
Temporal adverbs	<always, often, sometimes>
Adjectives of degree	<hot, warm, tepid>
Some verbs	<know, believe> <love, like>

[6] The Projection Problem occurs when more than one type, and often multiple types, of generalized implicature arise in a sentence giving rise to multiple conflicting inferences or inconsistent potential implicatures.

Constraints in the form of operative rules are required to prevent Horn's scales from over-generating to produce implicatures that do not occur (see section 3.6.1). There are two constraints on an entailment scale. The first specifies that items in the scale must be formally in salient opposition. The second states that they must also be semantically in salient, paradigmatic opposition. This ensures the items are in conceptually salient opposition.

Most criticism of the scales has been levied at the need for these constraints. Relevance theorists, in particular, argue against the writing of rules, which appear not to be independently motivated but which are invoked in order to save the GCI class. Carston (1995) especially attacks this strategy, which she perceives as explaining only a partial area of interpretation that would equally well be picked up through the explicature, guided by the Relevance Principle. However, this argument rests on acceptance of Relevance theory, and fails to acknowledge that some aspects of pragmatic meaning may form a system, with the usage constraints typical of any linguistic system. Moreover, the explicature of these phenomena may not readily yield the interpretive data that scalar implicature would suggest, unless motivated by a principle of scalar implicature. The generality and systematicity of these principles cannot simply be discounted.

The evidence for the explanatory power of GCI, as based on the principles of salient opposition established by the scalar implicature and entailment scales, also needs to be considered. Probably the most compelling evidence is Horn's (1972) insight that GCI can be shown to provide constraints on lexicalisation in natural languages. The basic constraint imposed is expressed as follows:

> "If the use of a lexical item w carries a generalised conversational implicature I, then ceteris paribis there will be no lexical form x that directly encodes I."
> (Levinson 1983: 163)

This is a redundancy constraint. In English there is a systematic paradigm of realized and unrealized incorporations of the negative, which can be explained by the principle of scalar implicature. The principle is that use of a semantically weaker item in the

scale implies the negation of the head. This produces and explains the lexical gap shown in the table (Table 3.1) below:

Negative phrase	**Lexical incorporation**
not possible not necessary	impossible * innecessary
not some not all	none * nall
not sometimes not always	never * nalways
not or not and	nor * nand

Table 3.1. A lexical gap: unrealized negatives in English

Note: * marks an unrealized form.

There are two further sets of evidence that show how GCIs interact with language structure. One set is evidence from diachronic studies. Levinson's (2000) development of GCI can be shown to have explanatory power in accounting for the historical development of one kind of polysemy (Grundy 2000:118). GCI could also account for the process by which creative metaphors appear and are gradually conventionalised as conceptual metaphors before taking on a new coded meaning. Another set of evidence is the explanatory power of the GCI in resolving certain issues that are traditionally sticky problems for analysts. For example, the relation between the sentential operators *possible* and *necessary* and the modal verbs *must* and *may* can be explained quite easily through a conversational inference based on scalar implicature (Levinson 1983:140). Scalar implicature can also provide an account of the non-detachability of implicatures raised by Sadock (1978:291) (Levinson 1983:143).

There are therefore strong grounds for recognising that the system of CGI has an independent life of its own at the level of usage and not of use. As a result any attempt to reduce GCI to a component of explicature is very probably mistaken. I shall now move on to the other two significant features of Relevance theory: the use of

deduction to derive the implicature and the modelling of the cognitive process of language interpretation as procedural, which gives rise to strong claims of psychological plausibility.

In the Relevance theory framework inferences are drawn through deductive reasoning motivated by the Relevance Principle. Deductive reasoning systems are monotonic systems; i.e. non-defeasible. They do not permit the inference to be cancelled by the addition of further premises in the argument. It seems highly unlikely that implicatures can be drawn from these inferences because implicatures are by definition defeasible. Further, it is quite possible, as Johnson-Laird (1983) has argued that deduction plays little part in human reasoning. In response the school of Relevance claims that deduction does indeed play a relatively small role in processing, and that the major share of processing activity is creative hypothesis-formation guided by the Relevance Principle (e.g. Carston 1995). This hypothesis formation occurs at the stage of explicature; and consequently implicatures are a by-product.

Moreover, throughout this account everything rests on the rather loosely defined Relevance Principle. Optimal relevance is attained through a calculation of contextual effects over processing cost. However, it is impossible to calculate (or even adequately characterise) optimal relevance if there is no measure of processing costs. A startling aspect of Sperber and Wilson's model is that no explanation is offered for processing cost, despite the fact that it is a central part of the theory. As there is no explanation, there can be no means of measuring processing effort (Levinson 1989). It is nevertheless, feasible to leave such cognitive issues aside until there is further evidence from research in other fields. However, the principle is not otherwise defined. It should be possible to "enrich" the notion of Relevance to identify a set of core components that are always present when the procedural instruction of seeking relevance is passed to the processing "units" of the brain. No such "enrichment" has been carried out, but if it existed it would have to include reference to both the participants' local conversational goals and to their global goals with respect to the context of the activity or speech event. As has shown to be the case with GCI, the explanatory power of our knowledge of a wide range of context-frames (genres) cannot be simply pushed to one side.

The third significant feature of Relevance theory is that interpretation of verbal communication is described as non-representational and procedural. They have indeed shown how a procedural encoding can instruct conceptual encoding and decoding. This is quite a powerful claim to psychological plausibility (Blakemore 1992, Carston 1995, Sperber and Wilson 1995). However, it is far from obvious that all interpretation can be carried out according to a single operative principle. While, it is acknowledged that an operative Relevance Principle is required in understanding verbal messages (Levinson 2000) and that this maxim or principle is the keystone of PCI, GCI relies on the Gricean maxims of Quantity and Manner (see 3.6 and Horn 1984). Having established a case for GCI, then it follows that there is also a case for the principles that underlie these meanings. The argument rests again on where the boundaries are to be drawn between inference and implicature and the role of context.

Before completing the discussion of Relevance theory by summarising its relative strengths and weaknesses, it is worth considering whether the model could be substantially rescued by substituting another procedural instruction for the Relevance Principle. The natural alternative is the principle of Accommodation (Lewis 1979), which has been used as the basis of other context-dependent theories of implicature (e.g. Hobbs 1987, Thomason 1990).

3.5.3. Accommodation Theory

The core of Accommodation theory is that there are well-defined felicity conditions on the usage of particular expressions. Against this background of expected use, a co-operative recipient, who will assume the felicity conditions in their absence, can accommodate deviant usage. There are therefore two essential ingredients in an accommodation-theory driven mechanism for implicature.

1. Utterance U must contain a trigger T which is an expression whose felicity conditions require that a proposition of the class P must be an element of the common ground.
2. If U is uttered and there is no proposition of the class P presumed in that context, then for T to be treated as felicitously used the recipient must infer p, such that p belongs to the class P.

(Levinson 2000:60)

The first application of Accommodation theory to pragmatics was to account for certain properties of presupposition (Heim 1982); and the concept works well as an account of presuppositional inference. However, Thomason (1990) and Hobbs (1987) argue that a full theory of implicature can be developed on the basis of non-monotonic reasoning systems in combination with Accommodation. Like Relevance theory, this argument presupposes that GCI can be subsumed within a single procedural principle.

There are some fairly convincing arguments that by its nature GCI is not reducible to Accommodation. Firstly, the underlying principle of Accommodation theory is the Gricean mechanism of creating a system of meaning out of deviant behaviour. However, the inferences arising from GCI are not based upon an instance of rule breaking (Grice's flauting). Instead, these are default meanings that arise gratuitously and by definition do not involve inferential processing. Secondly, as the meanings a GCI gives rise to are default inferences, it follows that these are not inferences which need to be put in place in order to maintain particular felicity conditions. GCI is operative at a different level than expressions that rely on felicity conditions for appropriate usage. GCI operates at the level of utterance type, whereas usage constraints apply at the level of utterance token (See 3.6.1 for full discussion of this point). Thirdly there is an argument from defeasibility. A GCI is defeasible in the light of inconsistent or unsupportive contextual assumptions. It is consequently, contradictory to the nature of GCI that GCI-inducing expressions can be accommodated into the common ground just to motivate a communicative action. Finally, Levinson (2000:62-63) argues that his theory of GCI provides a more elegant and accurate explanation for the interpretation of co-textual discourse referents then Accommodation theory, which can be shown to predict incorrect relations between referents.

In conclusion, Accommodation theory is not found to be sufficient to generate a complete theory of implicature. We are left again, with the irreducibility of the GCI category.

Summary

For Relevance theory to meet its claims of being a comprehensive theory of communication, there must be no place for default systems of meaning. However,

there is sufficient cross-linguistic evidence to support the inclusion of a system of default meaning in a model of utterance interpretation. Further support can be found in the explanatory power of the notion of default meaning (or GCI) to provide an account for traditional issues in semantic meaning and meaning relations. The conclusion is that while Relevance theory may form part of a comprehensive model of communication, it is not sufficient as a stand-alone theory.

Nevertheless, although the definition of the Relevance Principle needs to be refined to accommodate goal-directed behaviour, the formulation of the principle contains very powerful and fundamental insights into the nature of the constraints on verbal communication. Probably the most significant aspect of the Relevance formula is the understanding that communication is constrained and affected by the tension between the principle of informativeness and the principle of economy. Another equally powerful insight is the introduction of a three-tier system of meaning. Having three tiers calls to attention that Grice's traditional division between semantics and pragmatics, where the output of semantic meaning is input to pragmatic processing, fails to account for the way in which propositional meaning is realized. This failure is now referred to as "the Gricean circle", since Grice also recognised pragmatic input to propositional meaning. Thus, the traditional relationship of semantics and pragmatics is rejected and new explanations of the relationship between the systems are formed.

Moreover, the reliance on deductive reasoning systems between the tiers leaves Relevance theorists to ascribe most of the processes of utterance interpretation to creative-hypothesis making in accordance with the Relevance Principle (Carston 1995). The circularity of this argument has been noted. Of greater significance though is the need to find non-monotonic systems of reasoning which will adequately account for this motivated enrichment of the syntax, and which will provide a more defined system and greater generality than the Relevance account.

Relevance theory has therefore contributed significantly to linguistic and pragmatic theory. It certainly has a part to play in understanding how utterances are interpreted and provides a much-needed development and articulation of Grice's relevance maxim. The next section of this thesis considers Levinson's theory of generalised conversational implicature (GCI), which has developed in parallel and, in some

respects, in opposition to Relevance theory. Moreover, while these theories may appear to be in opposition, the two schools of thought have inevitably been mutually informing. Although the theories as they stand are not complementary, there are deep-running parallels and consistencies in the understanding of the principles underlying communication and the way in which this can be modelled. One of the aims of the next section is draw out these similarities in order to inform the way in which a scheme for data analysis should be constructed.

3.6. Levinson's Theory of Generalized Conversational Implicature

3.6.1. Levinson's theory of GCI

Levinson's theory of GCI is a radical development of Grice's original category, as informed by the work of the neo-Gricean or Radical Pragmatics approach to conversational implicature (Atlas and Levinson 1981, Harnish 1991, Horn 1984, 1989, Levinson 1987, 2000). Nevertheless, Levinson's version inherits the structure of Grice's original scheme. His theory of GCI is therefore just one aspect of a theory of conversational implicature, which has relations to the other Gricean categories of literal meaning, conventional and particularized implicature (as discussed in section 3.4). Indeed, Levinson specifically acknowledges that any scheme of inferential meaning must include a PCI category alongside the GCI category. His argument is that Relevance theory cannot provide the model for this category, which should be based upon a revised version of Grice's Relation maxim, based on goal structures of the activity.

Levinson characterises his theory of GCI as a theory of preferred interpretation. A GCI is a default meaning triggered by the speaker's choice of expression and generated in accordance with certain pragmatic principles, which will go through as the preferred interpretation unless there is contradictory evidence in the database (human memory and knowledge base) which blocks the inference. A GCI is context-independent. The category is a level of systematic pragmatic inference that is not based on computations of speaker intention but is related to form and syntax and general expectations of how language is used. At this level, default interpretation makes reference to pragmatic systemic knowledge about speech acts, felicity conditions, conversational pre-sequences and other preferred patterns of organization.

As such, in Levinson's interpretation of meaning, GCI is an example of utterance type and not utterance token.

The utterance type/utterance token distinction is a traditional idea and goes back to the three layers of meaning of *structural linguistics* as discussed by Bloomfield. In pragmatics, Austen's three-part scheme of locution, illocution and perlocution (see 3.2.4) has fundamentally the same scope and domain as the structuralists' distinction between sentence meaning, utterance type and utterance token. In contrast, Relevance theory is concerned with utterance-token. Therefore, prompted by Sperber and Wilson's views on explicature, one of the first questions to ask in considering the feasibility of a theory of utterance type is whether this commits us to an associated theory of context types? Or to put this in another way is it possible to assign pragmatic meaning to a linguistic expression without direct reference to a context of use?

The idea of matching utterance types with context types to generate a potential meaning can be traced back to the old distinction between the sentence and utterance, where the sentence is an idealised construct and the utterance an interpretation of the coded meaning of the sentence in a specific context of use. This is now an outmoded form of reasoning, as established precisely by Sperber and Wilson's work in recognising that propositional meaning is an interaction of content (which includes coded meaning and other aspects of form and structure) and contextually-driven pragmatic reasoning. The issue then remains as to how Levinson's scheme can account for the derivation of a truth-conditional proposition, which includes and depends on pragmatic input, while retaining the utterance type category as context-independent.

The issue arises mainly because of the opposition of the school of Relevance theory to the idea that implicature need not be functionally independent from truth-conditional content (Carston 1988, 1995). Relevance theory requires all aspects of propositional meaning to be resolved within the process of explicature, including indirect meanings of the speech act variety. In contrast, while Levinson acknowledges the confusions of the "Gricean circle", and recognises the function of pragmatic principles in determining truth-conditional meaning (which he calls "pragmatic intrusions"), he

retains the layer of implicature, whether GCI or PCI, as added-value information to "what is said". On this interpretation the implicature is part of sentence meaning, which is unacceptable to Relevance theorists.

If the requirement for functional independence is dropped (and there is no strong evidence for this position), then there is no good reason to assume that Levinson's modelling of the relationship between propositional meaning, coded meaning and implicature is wrong. He proposes that the same pragmatic principles apply recursively at different levels of meaning. In his three-layer scheme, the same pragmatic principles will determine reference assignment, lexical disambiguation, ellipsis, and various other phenomena sufficient to generate a truth-conditional reading at the level of sentence-meaning, where the sentence is not an idealised construct but a communicative unit which contributes to interpreted meaning. Implicatures are then determined, guided by the same pragmatic principles. Communicated meaning will be a combination of "what is said" (truth-conditional proposition) and the implicatures stereotypically associated with the coded meaning, if a GCI, or as used in context, if a PCI.

Levinson's argument is that GCI, which is an example of utterance-type, is a form of short-circuited implicature. In some sense, GCIs are a large set of idiomatic expressions. The members of the set are characterised by the highly conventionalised association of a coded expression with a restricted range of meanings. The set consists of three interacting sub-sets, each of which can be explained as following a systematic pragmatic principle. Moreover, Levinson has been able to draw upon an extensive range of cross-linguistic data that display the patterns of GCI, particularly with respect to scalar implicature, preferred co-reference and anaphora (Levinson 2000, 1987).

In sum, the situation is that the opposition between the two schools of thought rests on two points. Firstly, instead of the single Relevance Principle being applied recursively to different levels of meaning, the multiple principles of Gricean reasoning are applied at the level of sentence meaning while at the level of implicature three principles are applied to generate GCIs and the principle of Relation is applied to generate PCIs. Secondly, the account given for implicature is different. In Levinson's

scheme the coded content and the manner of expression directly form part of the implicature. On a Relevance account, these conversational features will inform the implicature. Having already arrived at the conclusion that GCIs can but should not be reduced to explicature (discussed in 3.5), one of the aims of this section is to consider what advantages Levinson's theory of GCI may have over an exclusively Relevance approach.

It remains in this introduction to briefly characterise the three general pragmatic principles that motivate generalised conversational implicatures, and to explain how they accomplish the criteria of the principle of economy and the principle of informativeness. The separate GCI principles will then be considered in more depth.

The three principles that generate GCIs are called principles, but they are in fact inferential heuristics. As heuristics, they are an instruction to the hearer to apply knowledge based on previous experience of the input type to provide an interpretation of the communication. This is quite an important feature, as the way in which Levinson uses the terms "heuristics" and " principles" interchangeably can be read to suggest that the model is rule-based and generative. However, the heuristics are procedural pragmatic principles. Further, following Levinson's lead I also use the term "principles" for the heuristics. The three principles (or heuristics) are:

1. The Q-principle

The Q-principle is based on Grice's first maxim of Quantity: "Make your contribution as informative as possible." This principle induces inferences from the use of one expression to the assumption that the speaker did not intend a contrasting, usually informationally stronger, one. The principle rests on the three pragmatic principles of scalar implicature, Horn's entailment scales and paradigmatic opposition.

2. The I-principle

The I-principle is based on Grice's second maxim of Quantity: " Do not make your contribution more informative than required." This principle induces inferences that are an interpretation of an utterance in line with our expectations of what is normal or typical. The principle explains how a maximal output is

obtained from the use of a minimal expression through amplification licensed with reference to the stereotypical.

3. The M-principle

The M-principle is based on two of Grice's sub-maxims of Manner: "Avoid unnecessary prolixity" (M3) and "avoid obscurity of expression" (M1). The principle induces inferences based on the assumption that use of a marked expression signals an opposing interpretation to that generated by the use of the complementary unmarked expression. The inference is thus triggered by the form of the expression and not by its meaning. The M-principle rests on the principles of Horn's 'Division of Pragmatic Labor'[7] and the notion of markedness developed by the Prague School of Linguistics. It relies on its relation to the I-principle, which generates the unmarked forms to which the marked forms of the M-principle category are complementary.

The scheme has the potential to result in the Projection Problem when the three inference types interact in a complex sentence. The Projection Problem occurs when more than one type, and often multiple types, of generalized implicature arise in a sentence resulting in multiple conflicting inferences or inconsistent potential implicatures. Therefore, the conditions under which inferences generated within sub-clauses are inherited by the complex sentence as a whole need to be defined. Levinson (1987) proposes a resolution schema, which consists of a hierarchical ordering in the inheritance of the inference types. In this schema, Q-based inferences take precedence over other types of inferences, and will block contradictory I-based or M-based inferences. In turn, M-based inferences take precedence over and block contradictory I-based inferences.

The rationale for this ordering is given in terms of parallels with blocking systems operative in syntax and morphology. It is assumed that there is a general principle running throughout systemic language systems to the effect that more specific rules block the application of more general rules. According to this rule,

---

[7] Marked expressions imply the complement of the stereotypical interpretation that are suggested by the corresponding unmarked form. See Levinson (2000) chapter 2: 2.4.1 for a full discussion (pages 137-153).

inferences based on highly constrained sets of lexemes, as Q-inferences are, block those based on wider-ranging contrasts of markedness (M-inferences), which in turn block the most general types of inferences based on learned stereotypes (I-inferences) (see 3.6.2 for a fuller discussion of this point).

All general conversational inferences are generated by a default logic mechanism. This creates the standard that the inference will go through unless information to the contrary is provided. In other words, the mechanism sets up the conditions for short-circuited implicature and for defeasibility, which are the hallmarks of CGI. It follows that the reasoning system that drives the default mechanism is also defeasible (or non-monotonic): and so cannot be deductive reasoning, which is a monotonic reasoning system.

Levinson considers the merits of four different non-deductive reasoning systems; induction, abduction, practical reasoning and default logics (Levinson 2000:45-49). In earlier publications (e.g.1987) the reasoning system he considered most compatible with the essential properties of GCIs was default logics. However, in the later publication, it is clear Levinson has revised this position. One weakness noted in unifying default logics and GCI, is that default logics do not capture generalisations and provide only a restricted set of inference rules. Other weaknesses noted by Carston (1995) are firstly that Levinson's characterisation of GCI suggests a piecemeal approach to interpretation that cannot be captured by default rules, and secondly, that certain of the patterns of defeasibility for scalar implicatures are incompatible with the default logic format. Circumscription is very briefly considered as a possible alternative (Levinson 2000: 49). However, overall, it is now clear that this aspect of the theory is completely unresolved and should be treated as work-in-progress.

The final stage in completing this sketch of Levinson' theory of GCI is to explain how the theory realizes the principles of economy and informativeness. The principle of economy is realized through the general procedure of amplification of information based upon use of a minimal expression. This procedure underlies each of the three principles. The principle of informativeness is realized through

the I-principle, and is determined not by degrees of relevance but by the extent to which an interpretation contributes to cohesion and to specifying referents.

3.6.2. The Q-Principle

The Q-principle has been briefly outlined in the previous section. The theoretical underpinnings of the principle are Gazdar's theory of scalar implicature and Horn's entailment scales, which have been explained and discussed as part of the defence of GCI in the review of Relevance theory (3.5.2). Here it is appropriate to extend the characterisation of the principle and to present in focus its scope and the linguistic expressions that typically trigger Q- inferences.

The principle is formulated as:

> "*Speaker's maxim*: Do not provide a statement that is informationally weaker than your knowledge of the world allows, unless providing an informationally stronger statement would contravene the I-principle. Specifically, select the informationally strongest paradigmatic alternate that is consistent with the facts.
>
> *Recipient's corollary*: Take it that the speaker made the strongest statement consistent with what he knows, and therefore that:
> a. If the speaker asserted A (W), where A is a sentence frame and W an informationally weaker expression than S, and the contrastive expressions <S, W> form a Horn scale (in the prototype case, such that A(S) entails A(W)), then one can infer that the speaker knows that the stronger statement A(S) (with S substituted for W) would be false (or K~ (A(S)) in Gazdar's (1979) notation, read as 'the speaker knows that it is not the case that (A(S))').
> b. If the speaker asserted A (W) and A (W) fails to entail an embedded sentence Q, which a stronger statement A (S) would entail, and {S,W} form a contrast set, then one can infer that the speaker does not know whether Q obtains or not (i.e., ~ K(Q) or equally, {P(Q),P~ (Q)}read as ' it is epistemically possible that Q and epistemically possible that ~Q').
>
> (Levinson 2000: 76)

Thus a core property of Q-inferences is that they are meta-linguistic (and paradigmatic), i.e. they make essential reference to what might have been said but was not. In this sense they are also negative propositions as what is implicated is the presumption that certain information is not the case.

This presumption follows directly on from inferences based on scalar and clausal implicatures (Gazdar 1979, Levinson 1983; Levinson 2000:chapter 3) and the entailment scales. Nevertheless, the Q-principle is not based on unmodified versions of these scales. There were three outstanding issues to be addressed before the scales could be adopted as the basis of the Q-principle. The first issue is to acknowledge the different levels of epistemic certainty (or uncertainty) implicated by scalar and clausal scales, without formulating rules. The second concern is to identify which constraints act on the entailment scales to prevent the scale over-generating, which would result in implicated negation of every proposition that entails what the speaker says (Atlas and Levinson 1981: 44). The third issue is to judge whether or not to block the raising of implicatures in negated sentences, which has been the traditional approach to the projection problem that is considered to arise in this context (Gazdar 1979:56-57, Hirschberg 1985: 73, Horn 1989:234).

Levinson's solution to the first issue is to use a common-sense approach to interpretation. It is assumed that all implicatures come with some degree of epistemic modification, but that the exact nature of the modification is under-specified at the level of the GCI. The solution to the second issue is to specify the conditions under which Horn scales operate. Two constraints are identified, and motivated according to Gricean reasoning. The first constraint requires that items on the scale must be in salient opposition, for instance of the same word class, in the same dialect or register and lexicalised to same degree. The second requires that scalar items must be from the same semantic files, i.e. 'about' the same semantic relations, and thus in conceptually salient opposition.

The one apparent exception to these constraints is the raising of implicatures in negative scalar items. The difficulty is regarded as a projection problem, whereby the interaction of the overt negation with the meta-linguistic negation carried by scalar items would produce implicatures that contradict, and do not entail, the literal proposition. Therefore, Gazdar (1979:56) argues, the assertion of " It is not the case that Paul ate some of the eggs" would implicate "It is not the case that Paul ate not all of the eggs" (i.e. Paul ate all the eggs). Levinson chooses not take the traditional blocking approach. Instead, he works from the assumption (established in Atlas and Levinson 1981) that the correct generalization is that negation reverses scales. These

negative scales are then in paradigmatic opposition to the corresponding positive scale.

This approach does deal with the contradictions revealed by Gazdar's example. It is also reasonable to assume, on the basis of parallels with other systems of salient opposition in syntax, semantics and phonology, that the process is quite general. However, the generalization runs into trouble with respect to the lexical gap for negative quantifiers (Horn 1989). Does the existence of the lexical gap just put into question Levinson's lexicalization constraint or does it require the writing of rules and sub-rules to account for these exceptions at different levels? To avoid writing rules Levinson introduces the notion of salient opposition between negative and positive scales. This may be a sleight of hand. However, until shown otherwise, this approach to negative scalars is probably adequate as a general guideline. It is a detail within the theory of GCI, and as such some degree of ambiguity can be tolerated.

Further, there are some well-established diagnostics for scalar implicature. These diagnostic tests consist of embedding into the sentence frame linguistic expressions that cancel the implicature without leading to contradiction (i.e. they test for defeasibility). These expressions consist of ranked sets of cancelling or suspending phrases. Levinson's diagnostic test for GCI scales is:

> "For any item xj weaker than xi on a scale, 'xj, in fact/if not/or even/or possibly xi' should be a felicitous phrase in an appropriate sentence-frame."
> (Levinson 2000: 82)

There are some standard types of expression that form scales and give rise to scalar implicatures. Gazdar's scales are ordered according to the logical relations between the items. Hence the order of items in scales of quantifying expressions and of scalar adjectives is quite predictable. Similarly, the rank order of items on the clausal scales, which are based on logical relations of a constructional and not semantic kind, can be stated without reference to context. Horn's scales are based on semantic relations, and specifically the relation of entailment that generates the principle that movement up the scale will always find an informationally richer lexical item. To recap briefly on the types of expressions that trigger Q-based GCIs, some examples are given below.

Examples 1-4 illustrate implicatures triggered by oppositions based on logical relations.

SCALAR IMPLICATURE:

Example 1: Quantifiers

[All, most, some, several few]

Example 2: Scalar adjectives

[excellent, commendable, good, average, fair]

[sub-zero, freezing, frosty, cold, chilly, fresh]

CLAUSAL IMPLICATURE

Example 3

If it rains, the party will be inside.

I-> If it does not rain the party will be held outside

Example 4

Keyboards can be bought at Dixons or Comet.

I-> They can be bought at both.

I-> They can be bought at just one of these outlets, but the speaker does not know which.

A Horn-scale can be observed in any set of lexical items that have a relationship of semantic entailment and conform to Levinson's two constraints. The range of potential scales is therefore very large. Typical examples include:

ENTAILMENT SCALES

Example 5

Most of the children enjoyed the puppet show.

I-> Not all the children enjoyed the show.

Example 6

I think the answer is Graham Green

I-> The speaker is not certain.

Example 7

We should start the meeting now, but not everyone has arrived

I-> There is no absolute obligation to begin the meeting.

Levinson (ibid: 98-104) extends the range of Q-implicatures beyond those based upon Horn scales or Gazdar's clausal scales. This is done by generalising the principle of opposition between informationally weaker and informationally stronger items to other salient sets of lexical expression that do not meet the entailment criteria for a Horn-scale. The crucial criterion to be met in deriving this type of scale is that there must be a genuine informational asymmetry between items on the scale, so that asserting the weaker item automatically implicates the stronger item does not apply.

Example 8: to the school/to a school/to school

Example 9: to the hospital/ to a hospital/ to hospital

Example 10: * college, school, learning circle, study group

Example 11: * hill, incline, slope

In examples 8 and 9, the opposition is between the choice of the definite article, indefinite article and zero-article in combination with items from a small set of words denoting institutions. What is interesting about these words is that choice of article (including the zero-morph) alone discriminates whether what is denoted is (i) the type of activity the institution is known for, (ii) some building where the activities of the institution are carried out, or (iii) a specific building, which is presumed to be known to both parties. Furthermore, the implicature is generalized and goes through without reference to specific contexts. It should be noted that examples 10 and 11 fail to establish genuine informational asymmetry, and thus use of the word 'slope', for example, does not implicate that 'hill' does not also apply.

The same pattern is observable with respect to anaphora (Levinson 2000: chapter 4). Determinate reference is informationally richer than potentially indeterminate reference, and scalar-like inferences are thus invoked by choice of the lower-ranking (weaker) expression.

3.6.3. The I-Principle

The I-principle, or principle of informativeness, was briefly described in the introduction to this section. The aim of this section is to extend the characterisation by addressing three aspects of the principle:

- an analysis of the key concepts contained in the formulation of the principle,
- an explanation of how the principle relies on participants' common ground
- a contrastive analysis of the Q- and I- principles.

The description concludes with examples of enrichment in accordance with the I-principle across a range of linguistic expressions.

The principle is formulated as:

> " *Speaker's maxim*: the maxim of Minimization. 'Say as little as necessary', that is produce the minimal linguistic information sufficient to achieve your communicational ends (bearing Q in mind).
>
> *Recipient's corollary*: the Enrichment Rule. Amplify the informational content of the speaker's utterance, by finding the most specific interpretation, up to what you judge to be the speaker's m-intended point, unless the speaker has broken the maxim of Minimization by using a marked or prolix expression. Specifically:
>
> a. Assume the richest temporal, causal and referential connections between described situations or events, consistent with what is taken for granted
>
> b. Assume that stereotypical relations obtain between referents or events, unless this is inconsistent with (a).
>
> c Avoid interpretations that multiply entities referred to (assume referential parsimony); specifically, prefer co-referential readings of reduced NPs (pronouns or zeros).
>
> d Assume the existence or actuality of what a sentence is about if that is consistent with what is taken for granted."
> (Levinson 2000: 114)

The I-principle automatically seeks out in a minimal and unmarked expression the stereotypical extension. Cognitively, it acts as an instruction to find an interpretation of the data that meets the requirements of being both stereotypical and highly

specific. The principle is procedural in nature and makes no reference to rules or rule-like behaviours.

Nevertheless, the formulation makes use of terms, which are pivotal to the way inferences are generated in accordance with the I-principle, and which require explanation. These pivotal concepts are: specificity (of interpretation), stereotype, a minimal expression, and informativeness. It is possible to provide a rough working definition for each of these terms:

Specificity: Formally p is more specific than q, if p is more informative then q (e.g. p entails q) and if p is isomorphic with q. P is isomorphic with q if each term or relation in p has a denotation that is a subset of the denotations of the corresponding expressions in q.

Stereotype: Levinson (2000:115) defines the stereotypical extensions as connotations regularly associated with meanings, but which are not part of the meaning. In an earlier and less general account, Atlas and Levinson (1981: 42) count temporal, causal and teleological relations between events as stereotypical.

Minimal: A minimal expression is an expression with semantic generality. Moreover, there are some grounds to believe that expression brevity and semantic generality combine in unmarked expressions (Zipf 1949 quoted in Levinson 2000:115), and may therefore be taken as joint predictors of the minimal. Pronouns are paradigm examples of the way this combination of constraints is economical on the surface but capable of a broad semantic scope.

Informativeness: To determine whether p is more informative than q, Levinson uses, as a rule of thumb, the criterion that p rules out more possible states of affairs than q. This criterion contrasts with the criteria for specificity, since it is not a formal measure but a procedure to enable a "best fit" interpretation.

Although it has been possible to provide a gloss for each of these terms, these glosses are inadequate in stand-alone mode. A proper characterisation of the principle, thus providing an understanding of concepts central to it, can only be obtained by imagining the principle as a working model.

The speaker chooses to use an unmarked expression knowing (or believing) that the expression carries certain connotations, which will be recognised by the hearer. Moreover, use of the unmarked expression signals to the hearer that these connotations are intended. Typical examples include the connotation that a nurse is usually female, reading a book at bedtime usually means a novel and Disney films are usually cartoons. The most typical and so the strongest connotation may be the generalised implicature, but it may also carry with it a string of other secondary associations (e.g. nurses are caring women, novels are light-reading) that will contribute to the implicature. Further, the procedure typically generates several competing potential interpretations. The interpretation selected on an occasion of use provides the "best fit" in respect to providing maximal informativeness.

Maximal informativeness obtains when the alternative chosen achieves higher levels of cohesion, (i.e. temporal, spatial, causal and referential connectedness, and actuality of referents) than others. Informativeness is therefore a matter of relations between different parts of the syntax and not related to a particular context. These implicatures are generalised and are generated by a conventionalised interaction between form, structure and meaning.

In what particular ways does this process rely on the presumptions that form the common ground between the participants? Basically, in this model the common ground is the corollary to the principle of minimization. In this scheme, Levinson (2000: 49) draws on Gazdar's metaphor of the common ground as a bucket, holding all the facts that are mutually assumed, either because they are common knowledge or because they have been asserted and accepted. Minimal coding therefore relies upon the assumption that the hearer will reconstruct the intended referent and meaning because he or she is drawing upon the same set of presumptions as the speaker. In this way, the choice of a minimal expression both exploits the common ground and gives some indication of what is taken to be part of the common ground.

In the course of a conversation new facts are added to the common ground. Each utterance is processed in such a way that its coded and implicated content is potentially added to the common ground. However, the potential may not be realized. In the case of implicated meanings inconsistency with pre-existing knowledge blocks

the implicature arising. Moreover, where there is a projection problem, Levinson's resolution schema comes into force as a hierarchical filtering system.

The full formulation of the resolution schema (Levinson 2000: 162-163) shows how utterance content is added incrementally to the common ground. The first criterion is that content is added to the common ground only if it is consistent with what has already been mutually accepted on the basis of preceding utterances in the conversation, or with assumptions which are taken for granted. Provided aspects of the content are consistent in this way, they are added in a fixed, hierarchical order:

1. the entailments of Utterance (U)
2. (i) the potential clausal Q-implicatures of U
   (ii) the potential scalar implicatures of U
3. the potential M-implicatures of U
4. the potential I-implicatures of U

In this scheme all the potential implicatures are generated and then filtered out by a process of incremental addition to the common ground. This resolution schema is a very important component of an account of GCI because it gives an account of default (or preferred) inference. It also gives an account of defeasibilty, which is modelled in terms of filtering by inconsistent, higher ordered assumptions and not in terms of local clashes resolved by consideration of a specific context.

However, as Levinson (2000: 163) observes, the filtering system is an idealization that does not handle a number of outstanding issues. One of the most important of the unresolved issues is that the model fails to account for cancellation of implicature at an arbitrary distance, although this is an attested phenomenon. Further, the scheme accounts only for the domain of GCI. The consequence of the criterion of consistency is that some particularized implicatures, generated by the Relevance Principle, will not be added to the common ground, even though PCIs are related to the presumed goal-structure of the activity the discourse contributes to. Thus, the schema is limited to modelling the mechanisms of GCIs, and does not, nor is it intended to, explain how PCIs are added to context.

Although the resolution schema is signalled as a first approximation, the lack of specification over the way in which PCIs are generated and added to the common ground is potentially a stumbling block. Nevertheless, the model is intended as an account of GCI, with accounts of PCI still to be determined. The schema is a central mechanism in explaining default meaning and in explaining how the informativeness principle can be realized as changing values, both within the restricted domain of a discourse and in the wider domain of diachronic language use. Critics of the model (e.g. Carston 1995) regard the clash between principles as a '*reductio ab absurdum*', avoidable by calculating the full content as explicature. This position has been considered above (section 3.5.2).

A potentially more damning criticism is that the model lacks psychological credibility and is a throwback to rule-based models of cognition, derived from Gazdar's work and firmly based in the tradition of Chomsky's generative grammar. For a full discussion of this aspect of Levinson's model see Levinson (2000: chapter 4). A few counter-arguments can be briefly made here. Firstly, the pragmatic inferences the scheme is concerned with are not syntactically specified. Instead they are inferred on Gricean lines. Secondly, heuristics are specifically not rules. By their nature heuristics are principles informing an interpretation on the basis of previous experience, and as such, they are self-adjusting. Thirdly, and lastly, the hierarchical filtering system mirrors blocking phenomena in morphology and syntax. In all cases the more specific rules (or principles) block the output of more general rules. This is a principle operating with such generality across the subsystems of language usage that it is hard to characterise it as a rule that has a specific application.

The penultimate stage in the characterisation of the I-principle is a contrastive analysis of the Q and I-principles. This is necessary on the one hand to summarise the common properties of all the different sub-types of I- inferences, and on the other hand to establish whether there is a genuine opposition between the principles which requires the resolution schema. Table 3.2 summarises the common properties of I-inferences and contrasts them with the properties of Q scalar implicatures, as determined by Levinson.

Common properties: I-inferences	**Contrasting properties: scalar implicatures**
i. I-Inferences are to more specific interpretations of what is said	i. Q-inferences are to more precise interpretations. e.g. 'some people' generates the sub-case 'some, but not all'.
ii. Positive in character: the extension of what is implicated is an extension of what is said	ii. Negative in character: what is implicated is that other sub-sets are ruled out by complementarity
iii. Inference is typically guided by stereotypical assumptions	iii. No reference to non-linguistic knowledge in deriving the implicature
iv. No reference to something that might have been said but was not. (absence of metalinguistic element)	iv. Inference is metalinguistic: it makes essential reference to contrasting members of the set.

Table 3.2: I- vs. Q- inferences (Levinson 2000:119).

It is clear from this summary that the way in which the Q- and I- principles are formulated makes them mutually exclusive. Nevertheless, a theory can be formulated in abstract to account for any contingencies. Carston (1995) argues that the opposition between the Q- and I-principles is spurious, and can be eliminated by reduction of all Levinson's quantity inferences to something approximating the I-principle. This would take the form of a general principle of enrichment, such that all inferences proceed from the utterance of an informationally weaker expression to the assumption that an informationally richer interpretation is intended. It is therefore sensible to test the statement that the Q and I-principles are valid and separate categories, by looking at evidence from language use.

The test case selected (as discussed by Levinson 2000: 129-134) is that of Neg-raising (a term derived from generative grammar). The phenomenon of Neg-raising is the tendency for negative main sentences with subordinate clauses to be read as negations of the sub-clauses (as in the examples below).

Example 12: I don't think he is reliable

I-> I think he is unreliable

Example 13: I believe he is not quite truthful

I-> I believe he is untruthful

The central issue is that in all languages only some predicates allow the Neg-raising meaning. Cross-linguistically, these are verbs of opinion, volition, obligation, probability and perception (Horn 1978: 322-232). It might be unclear why this issue is properly solved by pragmatic theory. However, the original Transformational Grammar explanation no longer holds with current syntactic theory because the negative can be lexicalised. An account based on semantic theory would lead down the path of semantic ambiguity and would lead to a multiplicity of idioms that could not be easily generated by a general principle. In contrast, a pragmatic enrichment explanation based on Horn's scales captures the generalisations appropriate to explain the phenomenon, without the need to write sub-rules.

A Horn scale usually gives rise to Q-inferences. However, in the case of Neg-raising the scale works in reverse and runs upwards along the negative scale. This is not allowed by the Q-principle. Further, the inferences have all the hallmarks of being generated by the I-principle. They are inferences to a more informative proposition that entails what is said. They are not meta-linguistic and do not impose any additional negation to the understanding of the sentence. What is the implication of this interface between the two principles?

The implication is that this is the exception that proves the rule. The pragmatic explanation is enriched according to a scale that behaves like a Q-scale, but is not one. Thus it complements Q-scales, and shows that proper Horn scales have properties that are so systematic and consistent that they form a separate category of their own. Further, the Q-principle generates inferences more economically than if the same inferences were calculated by a general enrichment rule, as Carston has suggested. Overall then, this test case, which works cross-linguistically, indicates that the Q- and I- principles are indeed separate.

The final part of the description of the I-principle gives examples of some prominent types of I-inference. As this is an overarching principle, the range of linguistic expressions that can give rise to I-implicatures is broad. Some of the most prominent examples include:

1. *Conjunction -buttressing*

The preferred and default reading for [p and q] is that q is temporally successive. If at all plausible, we tend to read in a causal link and a teleological link between the two.

e.g. Dick Whittington went to London and made his fortune.

The bomb exploded and shattered nearby windows.

2. Parataxis

Parataxis is the unmarked adjunction of clauses. I-inferences are generated to give maximal connectedness between clauses where temporal, spatial, causal or teleological relations stereotypically hold.

e.g. Alex lost his grip on the string. The kite flew away. (causal implicature)

Alex goes to school. He can read and write. (causal implicature)

Philippa watched a video and went to bed. (temporal implicature)

Philippa went to bed and read a book. (temporal implicature)

Cross-linguistically, parataxis is a widely attested phenomenon. Many languages make do without the complex set of inter-sentential connectives used in English, instead using parataxis, and the wide range of possible interpretations invited.

3. Negative strengthening

Many kinds of implicature are associated with negative statements. Usually these implicatures are generated by syntactic patterns that are explained by the Q-principle. Some other types are explained by the M-principle. However, there are also various kinds of negative strengthening implicature that are attributable to the I-principle. One prominent example is the phenomenon whereby negation of a sub-set of adjectives pragmatically (and conventionally) implicates the contrary to the attribute predicated, and not just the denial of the attribute as might be logically expected.

The sub-set of adjectives in question is sets of adjectives that are gradable antonyms. Examples include [hot, cold], [wet, dry], [good, bad]. Each item in the paired antonyms allows explicit grading, i.e. Africa is hotter than Sweden, Texas is drier than Scotland.

Within this set, the negative strengthening implicature is restricted to the negation of the unmarked (and morphologically unmodified) adjective. The effect of the implicature is to imply its opposite.

e.g. He's not a great intellect (I-> not clever at all)
The prognosis is not good (I-> the prognosis is bad)
He's not bad at mathematics (I-> good at mathematics)

3.6.4. The M-Principle

The Manner (M-) principle is closely associated with the I-principle. The marked alternative will always implicate the complement of whatever an unmarked expression would I-implicate. The essential property of the Manner heuristic is that it is invoked by the form of the expression.

The principle is formulated as:

> " *Speaker's maxim*: Indicate an abnormal, non-stereotypical situation by using marked expressions that contrast with those you would use to describe the corresponding normal, stereotypical situation.
>
> *Recipient's corollary*: What is said in an abnormal way indicates an abnormal situation, or marked messages indicate marked situations, specifically:
> Where S has said "p" containing marked expression M, and there is an unmarked alternate expression U with the same denotation D, which the speaker might have employed in the same sentence-frame instead, then where U would have I-implicated the stereotypical or more specific sub-set d of D, the marked expression M will implicate the complement of the denotation d...
> (Levinson 2000: 136-137)

The principle builds on two theoretical bases: Horn's (1984,1989:197) "division of labor" and the notion of markedness, derived from the Prague School concept (Jakobson 1939). Horn's point is that economy is sustained by the complementary relationship of the M-principle on the I-principle. Since the marked/unmarked alternates are denotational synonyms, form alone determines whether the stereotypical I-inference or its complement, the M-inference, is invoked. Moreover, the M-inferences are meta-linguistic in character and will arise by default whenever the

speaker uses a marked alternate. Therefore no reference to context is required to understand the intended inference.

Levinson's use of the notion of markedness focuses on the relation between formal markedness and semantic markedness. On the formal side, as compared to unmarked forms, marked forms are more morphologically complex, and less lexicalised, more prolix or periphrastic, less frequent or usual, and less neutral in register. On the meaning side, marked forms suggest additional meanings or connotations absent from the unmarked alternate. Further, the requirement for substitution within the same sentence frame restricts the scope of the heuristic, excluding for instance correspondence between active and passive constructions. However, the definition of the same sentence frame is not fully explained. This is a weakness in the account; and if this requirement were not in place consistency in applying the criteria and mechanisms of the principle would include active/passive constructions as marked/unmarked expressions varying mainly with register. Table 3.3 shows some typical examples of how this division of pragmatic labour is carried out.

Marked Form	**Basis of Opposition to Unmarked Form**	**Example**
1. Lexical doublets and rival word formations	Alternatives for the same denotation, varying according to register	Horse/steed House/residence Present/gift/offering
2. Grammaticalized and lexicalized expressions	Periphrasis	Grammatical possessive 's'/ definite description e.g. the picture of the child.
3. Repetition and duplication	Principle of contrast where the repetition is informationally redundant but used for emphasis or other stylistic effect.	He slept and slept. …in the dark, dark pond. …over and over again
4. Lexicalized form versus periphrasis	If there is an existing lexicalized form it is in opposition to periphrasis.	To kill/to cause to die Pink/pale red * to laughen/to make sbdy laugh

Table 3.3. Examples of the division of pragmatic labor

Summary

Levinson's theory of GCI offers a rational account of one set of relationships between form and interpretation, which is supported by cross-linguistic research, and which can also be used to explain certain diachronic patterns. Further, there is sufficient evidence of cross-linguistic regularity in the quantity-based implicatures to support the position that CGIs are operative at the level of utterance type, and as such are preferred (or default) meanings generated from the choice of linguistic expression. Additional supporting evidence comes from the fact that these Q-based implicatures can provide an adequate pragmatic explanation for traditionally thorny semantic problems; e.g. the lexical gap for a specific semantically bound set of negative phrases, Neg-raising and the relation of logic and the natural language operators.

The I-principle is closest in its characterisation and functioning to the rival Relevance Principle. However, the more complex definition and scope of the principle make it a preferable construct to the Relevance Principle. Firstly, as the I-principle operates at the level of utterance type, defeasibility is implemented without the requirement for multiple iterations that are calculated in a context. Secondly, the notion of stereotypical connotations is supported by some work in artificial intelligence (e.g. Parallel Distributed Processing) and accords well with notions of Vygotskyan ideas of cultural knowledge, and, even more specifically, knowledge held as part of one's membership of a community of practice (Lave and Wenger 1991). Thirdly, selection of the interpretation is determined by the criteria of maximal cohesion, which refers not only to local discourse cohesion but also to the goals of the activity. This separation of the mechanism generating the default meaning from the criteria for selection of the interpretation contrasts with the circularity of the definition of the Relevance Principle, and the recursion of the Relevance Principle at all stages of interpretation.

In addition to having a claim to empirical validity, overall, Levinson's account of GCI forms an elegant system, which economically models all the requirements theoretically predicted for an inferential system of human communication. It has two principles operating according to the principle of paradigmatic opposition (in parallel with the systems operative in syntax, phonology and semantics), and the third principle operating on strictly pragmatic notions of common ground, discourse

cohesion and Grice's maxim of brevity, but still standing in defined relationship to the other two. The model works on the dual action of the linguistic principles of opposition and maximization of input, and in this way is able to demonstrate how the two key principles of communication (the principles of informativeness and of economy), are realized in linguistic form. Moreover, the GCIs generated by the I-principle include information on speech acts and conversational pre-sequences etc. Meaning is thus portrayed as multi-composite, which is the view taken in this thesis.

However, the model should be treated as work-in-progress. In particular, there are only rough working hypotheses available for the nature of the default logic mechanism, for how the common ground is developed and for the resolution schema. Furthermore, if the model is to be expanded into a full development of Grice's scheme, there must be a proper account of the Relevance maxim.

3.7. CONCLUSION

3.7.1. Fitness to Purpose

How and to what extent is Levinson's GCI theory appropriate to the aim of this thesis? The general aim of this thesis is to describe the discourse strategies of a postgraduate CSCL group. The specific sub-aim is to describe the ways the participants use discourse to coordinate their interaction in a CMC environment. A secondary aim of the thesis is to consider whether the online discussions display deep-level engagement with the learning material.

The task of this thesis is to develop a content analysis framework for CMC text in order to pursue these aims. A number of influential content analysis frameworks that are used for CMC analyses were reviewed in the previous chapter (section 2.4). The conclusion of the review (see section 2.4.6.) is that one of the main issues surrounding the design of these frameworks is the difficulty of obtaining a reliable means of form-function mapping. This lead to higher rates of subjectivity in the coding and classification of the data than would usually be the case.

In recognition of this issue, the content analysis framework developed in this thesis is based in linguistic theory, and specifically in one aspect of pragmatic theory that is concerned with the interpretation of speaker meaning.

Of all the pragmatic models of inferential understanding considered, Levinson's has proved the most theoretically satisfactory for this purpose. Moreover, although the model is a general model of communication, and so not mode-specific, it has a number of properties that make it appropriate to a study of CMC transcripts.

- *The model gives a rational and empirically motivated account of the relation of form and GCI. This means a significant part of the analysis can be conducted on the basis of the linguistic expressions used.*

This is an advantage in the analysis of CMC-based learning discussions, which are more informal, unpredictable and dynamic than the face-to-face version of the same type of activity. Some aspects of the way participants engage in the activity are altered by social (section 2.2.1) and linguistic (section 2.2.2) behaviours arising from the mode-specific properties of CMC and by the changes in the tutor's and participants' roles (section 2.2.3). As a result interpretation of data by common sense understanding looks less reliable.

- *Levinson's account of GCI can be slotted back into a suitably modified version of Grice's original framework. This framework will include Grice's literal meaning (what is said) and conversational implicatures attributed to the Relevance maxim.*

Having access to the whole scheme of analysis gives a wider range of options to describe how speakers choose to encode their meaning. Further, the data under consideration consists of discussion of a topic and learning content that have been rehearsed (see section 5.2.2). While all reasonable expectations might predict that the unmarked forms, which presume a common ground (I-inferences), will be prevalent, it cannot be assumed that this is the case. The more comprehensive the analytic scheme is, the greater the reliability of the methodology.

- *Context is defined as a psychological construct.*

Both Levinson's GCI and Relevance theory define context in psychological terms; i.e. what can be presumed to be part of the common ground. This is a clear advantage in any analysis of talk, as it is never clear what to include or exclude in an explanation of context. However, it is especially beneficial to a discussion of CMC–based talk, which in practice is conducted on the acknowledgement that many of the factors that bear on the context of the discussion are unknown. For example, the usual practice for educational courses is to treat the shared conference files, where students are required to participate, as the only common context. This practice is upheld in this thesis even though other channels of communication are routinely used to discuss the management of the group and the conference content.

- *The I-principle reflects presumed knowledge (or what is taken as common ground)*

I-inferences can reveal what is presumed to be part of the common ground. The movement from use of a minimal expression to a maximum information value, with more or less unique denotation, uses the minimal form as a short cut or a mnemonic. However, it can only serve this purpose efficiently if both the associated meanings and their association to the chosen expression have been mutually accepted on a previous occasion. In this way, identifying the inference generated from the I-principle reveals what the speaker takes to be common ground.

This property also allows the researcher to track how the group develops a shared understanding of certain concepts and how the interpretation of these meanings changes as a deeper or more accurate understanding grows.

3.7.2 Profile of The Analytic Scheme

The argument within this thesis is that meaning is multi-componential (section 3.2). Understanding the meaning of an utterance involves arriving at an interpretation of the propositional meaning, the speech act intended, the speaker's conversational goal, and relating this interpretation to the linguistic choices made

by the speaker. Moreover, utterances are received and interpreted within a context. This includes at least the local conversational context (which in CMC is a textual context) and the broader context of the type of socio-cultural activity the participants are engaged in.

In the discussion of issues concerning the design of a content analysis framework for CMC (section 2.4.6), it was noted that the framework should consist of three sets of analysis. One level should provide parameters for the description of the activity type and setting. A second level should provide a framework for the analysis and classification of the conversational structure. The third level of analysis should provide information on the meaning of the text. This design plan matches Pilkington's (2.4.3) approach to a similar research task. It is also complementary with the description of meaning that is used in this thesis.

The aim of the next chapter is to present and explain the three-part content analysis framework developed for this thesis. The three analytic schemes that make up the three levels are:

- Levinson's description of Activity Type
- Conversational Analysis
- Levinson's GCI theory, modified to include PCI, and set within Grice's original model of conversational meaning (Figure 3.1).

CHAPTER 4: DEVELOPING THE ANALYTIC FRAMEWORK

4.1. INTRODUCTION

The aim of this thesis is to develop a method for analysing the communication strategies and discourse styles used by post-graduate students engaged in an online co-operative learning task. The study focuses particularly on how they use language to manage their interaction and to approach the task of jointly developing increased understanding of the academic subject topic.

This chapter and the next develop a content analysis framework based in pragmatic theory and apply it to the CMC transcripts in order to arrive at the categories for analysis. Pragmatic theories of utterance interpretation are used as the operative parts of the framework in order to produce a data-driven description of the discourse. For this reason, as discussed in the previous chapter, the theories used within the framework are well-established, general theories of conversation, which explain the pragmatic principles of communication, which speakers and hearers recognise as operative constraints on utterance interpretation (section 3.2). Thus, the framework will offer information on the choices individuals make within these general constraints, and also indicate whether and how they adapt their behaviour to the online environment.

In section 3.2. I argued that meaning is multi-componential. It was also observed that interpretation of a speaker's meaning is an inferential process, which includes processing linguistic form, propositional meaning, the speech acts performed, implicatures, and the speaker's conversational goal. Further, the review of the literature on electronic discourse (section 2.2.2.) and the review of existing content analysis schemes for asynchronous CMC discourse (section 2.4) show that the research should address the structure of the conversation, as well as provide a discourse analysis of message content.

The analytic framework needs to reflect this view of meaning and discourse. The framework developed in this thesis consists of a suite of analyses, drawing upon different

but compatible pragmatic theories, over three separate levels. The levels are hierarchically organized and there is a default inheritance relationship between the output of higher levels and those below. The top-level consists of a structural frame to describe the social activity (and language game) the interlocutors are engaged in. It predicts the types of goal directed behaviour typical for the activity. Levinson's (1979) theory of activity types is used at this level. The mid-level addresses the structure of the conversation and the types of conversational moves used. The traditional Conversation Analysis categories, developed by Sacks (1992a, 1992b) and Sacks, Schegloff and Jefferson (1974), are used in level 2. The third, and the lowest level, aims to provide an interpretation of speaker meaning, and it is based in Grice's theory of conversational implicature, and Levinson's re-working of this theory (as reviewed in chapter 3) in particular.

The aim of this chapter is to develop and to present the analytic framework. The next section gives an overview of the framework design. The following section (4.3) describes how each of the three levels is operationalized to analyse CMC based discourse. The framework itself is graphically represented in section 4.4, followed by a summary of the way the framework is used in 4.5.

4.2. OVERVIEW OF THE DESIGN OF THE FRAMEWORK

4.2.1 BRIEF OVERVIEW

The review of content analysis schemes, which can be used for analysing CMC transcripts, shows that there are five main issues to address in framework design (section 2.4.6). These can be summarised as:

- the need for multi-level frames of analysis over the same stretch of discourse; and in particular to map the structure of the conversation in addition to analysing message content and style.
- the need to adopt reliable methods of interpreting and coding the form-function relationship.

- the need to use an analytic scheme which picks up changes in meaning associated with particular words and terms, which occur as a natural product of learners working towards an increased understanding of academic concepts.
- the need to reach a working definition of context
- the need to identify the unit or units of analysis for each level of the framework.

Further constraints on conducting a content analysis of the transcripts of asynchronous CMC discourse are firstly that much depends upon the interlocutors' written competence and skill in projecting an online persona (section 2.2.1) and secondly, that the textual context in which the message is read may differ from that in which it was sent. The framework design for this thesis therefore aims to simulate the general processing conditions in which messages are interpreted online. The design also aims to allow for a close description of the discourse strategies and language the interlocutors use in their co-operative discussion task, on the basis of which the categories for the analysis can be developed.

To do this the framework is based on well established, and well-defined general pragmatic theories of conversation. The framework is restricted to three frames of analysis as it is anticipated that knowledge about the activity type engaged in, the conventional use of conversational moves, and linguistic form and meaning is the minimal level of information available to online interlocutors when interpreting message meaning, or conversely writing a message. Context is therefore being defined for the purposes of this study as a psychological construct, which combines knowledge of the general pragmatic principles of conversation and social activity specific information, such as the nature and purpose of the task engaged in and the roles of the other participants in this activity.

An abridged version of the framework is presented in figure 4.1. below. The complete version of the framework is presented in section 4.4. The next two sections provide a detailed argument for the framework and the way in which it used in this study.

Unit of Analysis	Level of framework	Output
The message	**Level 1**- Activity Type (Levinson 1979)	Defines and describes constraints on participation within the social activity. Defines participant roles constraints on speaker turns and the sequences of the activity. It therefore permits an interpretation of speaker goal.
The message	**Level 2**-Conversation Analysis (Sacks 1992a 1992b) (Sacks, Schegloff and Jefferson 1974)	Breaks down the message into its constituent conversational moves.
A conversational move (inherited from level 2)	**Level 3**-Grice's Theory of Conversation (1975) + Theory of GCI (Levinson 2000)	Provides an interpretation of speaker meaning, based on conversational moves, linguistic form; and also the interpretation of speaker goal inherited from level 1.

Figure 4.1. An abridged version of the analytic framework

4.2.2 Framework Level 1

As knowing the meaning of an utterance is to know the nature of the activity the language is being used in and in which the utterance plays a role, the top-level of the framework describes and analyses the social activity interlocutors are engaged in. The unit of analysis at this level is the message.

This idea that the social activity creates a framework of goal directed behaviour acted out through language derives from Wittgenstein's notion of the language game (Wittgenstein 1. Brown Books 1939:23). Metaphorically speaking, participation in the game depends on knowing the goals of the game and the rules of engagement. Playing the game involves knowing what are allowable moves and what combinations of moves are permissible. Skill in playing the game requires calculating how different moves and combinations of moves (i.e. strategy), in coordination with or in response to the moves of the other players, will achieve the desired goal in the most economical manner. So it is in a language game. The social activity creates expectations about what types of utterances typically occur in this type of activity. Roles are set out, and temporal, spatial and

teleological constraints are set in place. Together, these expectations and constraints determine what illocutionary force an utterance has and how to interpret specific conversational implicatures (Levinson 1979: 367-368, Grundy 2000:169).

The goals and rules of the game correspond to the traditional notion of the speech event (Hymes 1962), which Levinson (1979) prefers to discuss in terms of "Activity Types"; and Levinson's account will be followed here. Hymes' (1962) speech event and Levinson's (1979) activity type are frameworks to describe a standard social activity in terms of the operative variables along which the constraints on participation are mapped. Levinson's framework is preferred because unlike the speech event it includes activities in which communication is achieved through non-linguistic means, for instance the meaning of non-verbal ritual etc. in religious ceremonies or of moves in a game of chess. An activity type "refers to any culturally recognised activity, whether or not that activity is co-extensive with a period of speech or indeed whether any talk takes place in it at all" (Levinson 1979: 368).

As the definition makes clear the dominant influence on any activity type is the desired goal.

> "The notion of an activity type refers to a fuzzy category, whose focal members are goal-defined, socially constituted, bounded events with constraints on participants. Paradigm examples would be teaching, a jural interrogation, a football game, a task in a workshop, a dinner party etc."
> (Levinson1979: 368)

In an activity type, the goal defines and determines the meaning of all the elements and actions that constitute the event. Thus the five elements Levinson proposes as the structural framework for activity types are functionally and rationally adapted to the goal of the activity in question:

- Conventional episodes or stages in the activity.
- Norms governing the allocation of speaking turns.
- Constraints on who may participate and on participant roles.

- Constraints on the time and place an event can properly take place.
- Constraints on topical cohesion and conversational coherence.

The structural properties of an activity constrain the verbal contributions that can be made. Further, to each and every clearly demarcated activity, there is a corresponding set of inferential schemata. Knowledge of the schema and of the structural properties of the activity give rise to expectations about how the activity is enacted and managed and as a consequence, utterances have the illocutionary force they do have because of these expectations.

In keeping with the notion of the language game, the activity can be undertaken in a variety of different styles. Style here refers to the way a speaker organizes and presents his talk and the strategies used to achieve the communicational goal. Elements of style include the types of linguistic expression chosen, the use of non-verbal semiotic signals, whether the turn-taking and the illocutionary force of actions are as expected for the activity or are marked as unusual, the length and complexity of turns and use of any hedges or discourse markers with a meta-pragmatic function.

Differences in style can be appreciated with reference to the structural framework of the activity type. However, a finer-grained approach to describing the style of an event can be achieved by including information at the level of the local conversational structure, (framework level 2) and at the level of linguistic expression (framework level 3).

4.2.3 Framework Level 2

The description of permissible moves at the local level of participation in an activity type corresponds to the moves, which make up the local structure of conversation, as categorised by Conversation Analysis (Sacks et al 1974, Sacks 1992 a, 1992b, Schegloff 1992).

Sacks' (1992a, 1992b) seminal work on the structure of conversation shows how ordered and economical the system of natural talk actually is. The work also reveals the co-

authored nature of conversation. The work of the conversational analysts describes the preferred (natural) order for turn taking in conversation, the typical structure of conversation and the types of conversational moves used in interactive talk (Sacks et al 1974). Conversation Analysis thus provides both a template for the preferred structure of conversation, and a means to categorise and describe talk in terms of broad functional moves. A description based on this theory can provide useful information on how a speaker builds up his strategy through a series of moves.

The key idea behind the Conversation Analysis perspective is that talk is organized as a sequence of turns or turn-constructional units, which are bound together through relations of discourse coherence. A turn is a single stretch of talk by one speaker. Turns tend to alternate between speakers, and it is rare in audio-mediated channels for one speaker to take more than one turn in sequence. Most frequently, the current speaker selects the next speaker, the conversational aim of which is to attempt to determine the continuation of the topic. This can be done in face-to-face interactions through non-verbal means, such as eye contact, but verbal tactics dominate. These include use of the first part of an adjacency pair, address terms, specific repair techniques, such as the one word utterance of a "WH-question", and tags. Alternatively, on some occasions the topic or the participant role held may be the determining factors of the natural next speaker.

Turn taking is the cornerstone of the conversational analysts' model of conversational management. It might be argued that since turn taking, as defined, is non-existent in asynchronous CMC (Crystal 2001: 148), that the theory cannot be applied to these types of conversations. However, since the context of asynchronous CMC demands certain adaptations in behaviour to achieve general conversational principles (sections 2.1 and 2.2), the issue in justifying the use of the Conversation Analysis scheme in the analytic framework for this thesis is to determine whether the functional aims of the turn-taking system can be met in the online environment. As discussed in the literature review, there is evidence that users of CMC have developed adaptive strategies to preserve the functional properties of turn taking (section 2.2.2.2).

Several studies have observed the discourse strategy of creating the illusion of adjacency between topically and interactionally related messages, through use of quotation or paraphrase of the content of a previous message, the use of titles and headers as pre-sequences, or through direct address (section 2.2.2.2). These strategies achieve what Davis and Brewer (1997) call an orientation function. Further, most CMC software systems allow interlocutors to thread their messages to another message, thus creating physical adjacency within the transcript.

Moreover, studies by Herring (1999) and Condon and Czech (1996)[1] have shown that adjacency pairs are extensively used as a means to maintain topical coherence in asynchronous CMC discussions. These studies also observed that adjacency pairs are used as strategies to attempt to determine the continuation of the topic in play. Davis and Brewer (1997) note the extensive use of rhetorical questions for the same conversational purpose.

All verbal tactics for the selection of the next speaker, such as direct address, or direct uptake of another speaker's topic, pertain in asynchronous CMC conversations.

In CMC therefore, a message is equivalent to a speaking turn. This defines the message as a unit of analysis for this level of the framework. Moreover, within the structure of turn taking, a limited number of conversational moves are possible. Coding of the conversational moves within individual messages provides a reading of the structure of each message and the conversational moves individuals use to achieve their goals.

The permissible range of conversational moves within a speech community is called "members methods". This refers to the conversational features recognised by the parties in the conversation (the members) and the expected routines (the methods). As the questions of this thesis are not concerned with an ethno-methodological approach to sub-cultures, the "members methods" referred to are the standard version (e.g. Grundy

[1] These studies were reviewed in 2.2.2.2.and 2.2.2.3

2000:186-190). The methods can be grouped as those that can only occur as part of a speaking turn, those that can only occur as part of an exchange, and those that are more self-standing.

The first group among the methods that occur as part of a turn are verbal expressions used as openers and closures to a speaking turn. These expressions perform a negotiating function in the conversation, and will vary systematically according to the linguistic register of the event. An opening expression may typically negotiate the uptake of the speaking turn or consist of an address form. Typical expressions of closure are expressions of thanks or closing greetings, which in face-to face may include phonological or non-verbal signals. Pre-sequences and pre-closures are conversational moves closely associated with openers and closures. These moves convey the content of the negotiation. Typically pre-sequences make links to a previous speaker or topic, orient the audience to a new approach or negotiate an interpretation of a previous speaker's intended meaning. A pre-closure typically indicates a transition-relevant place. This signals that the current speaker is drawing to the end of the turn and allows the next speaker to prepare their contribution.

The second group of methods that occur as part of an exchange consists of turns that are part of an adjacency pair, effect conversational repairs or are "aizuchi"[2]. An adjacency pair is formed by adjacent utterances by different speakers, which must occur together to complete the co-operative speech act (Hancher 1979). Some typical examples are: [greeting + greeting], [request + response], [invitation + response], [Wh-question + response]. For most adjacency pairs there is an obvious preferred response, for example fulfilment of the request or acceptance of an invitation. The dispreferred response is therefore the marked alternative. A repair occurs when one sequence, either intended or actual, is replaced by another.

Aizuchi refers to the use of back channels to confirm, support and encourage the ideas expressed by the current speaker.

The third group of self-standing methods consists of longer turns, typically accounts, formulations and self-formulations. An account is a typical feature of talk exchanges, and often occurs as an explanation to accompany a dispreferred move. Accounts must be a representation of the event that both parties can agree on. They are typically followed by "formulations" in which the significance of the account and its consequence are formulated by the next speaker. Self-formulation is also possible.

4.2.4 Framework Level 3

The third, and lowest level, of the framework makes an interpretation of the meaning (propositional content and illocutionary force) of the conversational moves within each message, as identified by the analysis at the second level, using the Conversation Analysis categories. The unit of analysis at level 3 is therefore a conversational move.

This level inherits through default relationship, not only the unit of analysis but also all the information obtained about a message from the analyses performed at the two higher levels of the framework.

The theory mainly used to conduct the analysis at this level is Levinson's theory of generalized conversational implicature, which is a development of Grice's original theory of conversation. Grice's theory of conversational implicature and Levinson's theory of GCI have been discussed in depth in the previous chapter. However, it is appropriate to briefly recap the main arguments for inclusion of this theory within this analytic framework.

According to Levinson's theory of GCI meaning interpretation is processed over linguistic form in combination with information on the conversational goals of interlocutors. Moreover, since a GCI is default meaning triggered by linguistic form, an interpretation of meaning can be made with minimal reference to immediate contexts of use. Within asynchronous CMC environments, where the context constantly shifts, this is an advantage. Further, a default reading reduces the level of subjectivity in the coding procedures, and places the researcher closer to the conditions under which interlocutors

in the online discussion task received the message. Using this theory therefore reduces the difficulties of interpreting the form-function relationship

Nevertheless, the analytic framework for this level does not consist exclusively of Levinson's theory of GCI. The theory is rightly placed within Grice's theory of conversational implicature, of which it is a part. Further, a full Gricean model includes the category of particularized conversational implicature (PCI), which is calculated by the Relation (or Relevance) maxim, within a specific context of use. The full framework for this level is represented graphically in Figure 4.2

By applying the framework to each conversational move within the message, and combining this information with the output of the two higher levels, it is possible to arrive at an interpretation of the communicative acts performed in the message and the intended meaning. Further, as each message is coded individually, where there is ambiguity, as in the interpretation of PCIs for instance, the description obtained from the framework for other related messages in the transcript can be used as additional input.

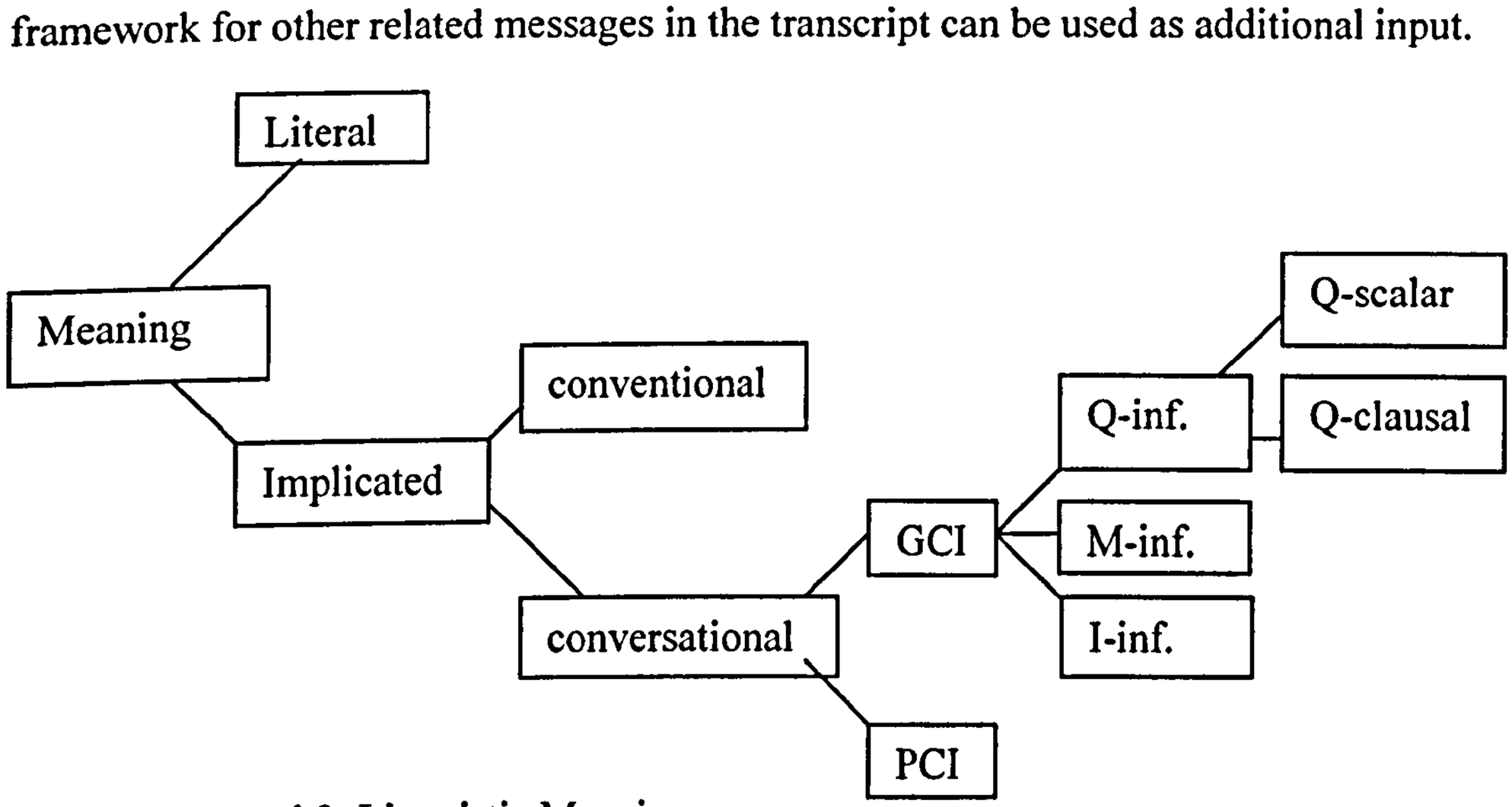


Figure 4.2. Level 3: Linguistic Meaning

Summary

This section has presented an overview of the content analysis framework that will be used in this thesis. The framework consists of a suite of three separate levels of analysis, each based in a different pragmatic theory of conversation. The levels exist in a hierarchical relationship to each other and together describe the structural and pragmatic properties of a speech event. There is a default inheritance relationship between the levels.

Five issues have been identified as significant in the design of frameworks for content analysis of CMC transcripts (sections 2.4.6 and 4.2.1). The design of this framework has attempted to address these issues. Firstly, the framework is designed to conduct different levels of analysis over the same stretch of discourse. Secondly, the use of Levinson's theory of GCI, together with the default inheritance of the output of higher levels within the framework is expected to reduce the difficulties of interpreting form-function relationships. Moreover, (and thirdly) as each message and each conversational move within the message is coded individually, it is expected that changes in meaning associated with specific terms will be identified. Fourthly, the unit of analysis for each level is defined by the theories used within the framework, and there should be little ambiguity in applying the descriptions. Lastly, following Relevance theory (section 3.5) and Levinson's theory of GCI (section 3.6) context is defined as a psychological construct. The framework therefore operates by and large independently of calculations of the specific message context.

4.3. OPERATIONALIZATION: THE FRAMEWORK IN DETAIL

To operationalize the analytic framework for this study, the values for the top level of the framework have to be entered. Further, there is consideration of whether modifications are required to the Conversation Analysis categories to adapt the scheme to the analysis of discourse conducted in an asynchronous CMC environment. It is anticipated that no changes are required to the third level of the analytic framework, which is based on general pragmatic principles of conversation, and so none will be made.

4.3.1 Level 1-Activity Type

The transcripts, which make up this study, are from a fully online module in a University of London Masters degree, with a maximum cohort number of twenty participants taught by one tutor. The data, which is used in the study, consists of the transcripts of the students' talk while engaged in a co-operative learning task.

Levinson's theory of activity types (section 4.2.2) is the analytic frame for this level. Levinson proposes five elements as the structural framework for activity types. The values for the specific context of this study can be entered for each of these five elements.

- *Conventional episodes or stages in the activity*

In general, Salmon's (2002a: 204) 5-stage model of the progressive stages of social interaction, information exchange and knowledge building describes the conventional stages of an online discussion group, and a CSCL group in particular. Salmon's model also includes a description of the nature and types of support and intervention the learner group typically requires at each stage. The model is described in full in section 2.2.3.

Further specification of the conventional stages of the activity comes from including in the description the stages typically required to complete the specific task in focus. The co-operative task the students in the study were engaged in involved preparing and conducting an online interview with a subject expert. The task consisted of four different activity types: group discussion, joint decision-making, a critical review of the interview and a joint writing task. The task is discussed in detail in section 5.2.2.

- *Norms governing the allocation of speaking turns*

In a postgraduate group working on a co-operative learning task online, there are no specific norms governing the allocation of speaking turns, other than the general expectation of a fair distribution of participation (Slavin 1995).

However, analyses of electronic discourse have shown that interlocutors in asynchronous online discussions use certain strategies to encourage participation and to invite the next speaker (as reviewed in section 2.2.2.2). These strategies include extensive use of adjacency pairs, and the use of the first part of an adjacency pair to initiate interactions in particular (Condon and Czech 1996, Herring 1999). Davis and Brewer (1997) also observed the rather extensive use of rhetorical questions as a discourse device to introduce a topic and to invite responses.

Further, Davis and Brewer (1997:13) estimate the natural span for reading messages within the transcript before formulating a response as being in the range of five to ten messages, depending on message length and complexity. This acts as a natural constraint on speaking turns.

- *Constraints on who may participate and participant roles*

The main constraint on the ability to participate is enrolment on the postgraduate course overall and on the module in particular. Obtaining candidature in both involves having acquired levels of academic competence to the required standard, subject expertise, and the motivation and ability to complete all stages of the course.

In the task, which is the basis of this case study, the students work in small groups of 3-4 participants (McConnell 2000 and as discussed in 2.2.3). These groups are closed groups, in the sense that all members of the course cohort are entitled to read all the small group discussions but are expected not to contribute messages other than to their own working group.

Each small group is led by a volunteer peer co-ordinator, whose role is to manage and direct the conversation and to steer the group to completion of each of the stages of the task. This is a preferred mode of working in CSCL groups to avoid topic drift and over-extension of the time-schedule for task completion (section 2.2.1.2.)

As the tutor in an online discussion automatically has a greater status and additional responsibilities with respect to assessment and the management of the learning groups, the tutor holds an unequal power status with respect to other members of the online course. As a consequence, the tutor not only has a different role in the discussion, but the tutors' messages attract a different degree of attention than those posted by student colleagues. This point was discussed in detail in 2.3.1.

- *Constraints on the time and place an event can properly take place*

A degree course module can only properly take place under the auspices of the award-bearing institution, in this case the University of London.

As the module is a fully online module in asynchronous conditions, there are no absolute restrictions on the time of contributing messages. However, for this task temporal constraints were introduced to maintain a critical mass among a very small group of contributors. Therefore two deadlines were imposed. The first deadline was for the submission of interview questions to the subject expert mid-way through the four-week task and the second was the official date for task closure.

The co-operative task was conducted entirely online, within the course and task designated areas established for this purpose.

- *Constraints on topical cohesion and conversational coherence*

The main constraint on topical cohesion and conversational coherence in CMC environments is the altered conversational structure created by the non-linear mode of communication, as described in section 2.2.2.2. Multi-party asynchronous CMC conversations typically evolve as multi-layered, apparently interactionally incoherent stretches of talk, where there is sporadic topic development and the residue of decayed topics interleaved with active topic threads (Herring 1999).

Nevertheless, in managed learning contexts, course designers use manipulations over task type, group size and composition, and the design of the learning environment to increase levels of coherence and cohesion (section 2.2.3).

Moreover, users of CMC have developed strategies to address this constraint. Firstly, the use of adjacency pair sets to create interactional coherence has been widely observed (section 2.2.2.2).

Secondly, various orientation strategies are used to re-establish the frame of the conversation, where physical adjacency, through computer-mediated threading, is not assured. This approach has become formalised in the basic message schema (Herring 1996 discussed in section 2.2.3). The basic schema for a CMC message consists of an introduction that establishes links to other messages, the body of content, and a closure. The various ways in which links are made to other messages include the use of titles, direct address, quotation and paraphrase, and the use of extended pre-sequences (section 2.2.3).

In conclusion, the five structural elements of Levinson's activity type allow for a reasonably accurate description of the speech event and of the expectations of the participants within this event. Moreover, the goals of the activity within this study are clearly defined as gaining mastery of the course material in order to pass the module, which is a part requirement for a full Masters degree. To achieve this overall goal, the participants need to work together to complete the task. The prediction is therefore that local conversational goals will be mainly concerned with group maintenance, task completion and interpretation of the learning material.

4.3.2. Level 2- Local Conversational Structure

The theory used to conduct the analysis of conversational structure and message structure is Conversation Analysis. Conversation Analysis is a general theory of conversation, but has been developed on the basis of audio-mediated interactions, for instance telephone conversations and face-to-face interactions of all kinds. In principle, a general theory

should apply across all media. Nevertheless, the altered contextual conditions of CMC interaction (as described in section 2. 2) may exclude or inhibit certain conversational moves or certain functions conveyed by these moves. The aim of this section is to consider what modifications may be required to the Conversation Analysis categories to adapt the scheme for use with CMC transcripts.

In this study the message is treated as the equivalent to a speaking turn. Looking at the interactional properties of a CMC message supports this practice. A message is a bounded unit, with a clear beginning and an end, and may be of any length. It is very rarely an isolated unit, and lack of response to a message is marked as dispreferred behaviour. Messages can occur as part of an exchange (part of an adjacency pair or a repair for example) or be longer self-standing messages offering an account or formulation. Messages may also be used to convey support or agreement, and need not be content-based or verbal (for example the use of graphics or emoticons).

Within the structure of turn taking (or message exchange in this study), conversation is managed through conversational moves. These moves have been grouped as three sets of member methods (section 4.2.3).

The first set of member methods are turn opening and closing moves. The set also includes pre-sequences and pre-closures. Opening moves are traditionally used to negotiate meaning, to negotiate turn uptake or to address or identify the audience. Closing moves are traditionally used to signal the end of the speaker's turn. Pre-sequences often have an orientation purpose and are used to set or to negotiate the hearer's expectations for the content and meaning of the current speaker's turn. Pre-closures are usually used to negotiate the exchange of the speaking turn. They can also be used, for orientation purposes, to select the next speaker, or to determine the way in which the topic might be developed, through use of a question for example.

In CMC contexts opening and closing moves are not used to negotiate speaking turns, as this is neither possible nor required. Moreover, there is no possibility of interruption,

overlap and no co-terminous channel for negotiating meaning. However, the orientation functions of opening and closing moves and pre-sequences and pre-closures have been observed and documented in CMC (section 2.2.2). An additional move type in CMC is the message title, which is widely used for topical cohesion and to frame the reader's expectations for the messages (Davis and Brewer 1997).

Electronic discourse is described as a new register, but one that compares most closely to letter writing (Collot and Belmore 1996, Davis and Brewer 1997, section 2.2.2.1). Like letters, the opening conversational move is typically a form of address to the intended audience. Similarly, the closing move generally consists of a greeting and the interlocutor's name or pseudonym. Messages are almost always closed with a name, and this is the conventional (default) mode. On the other hand, an opening address form is optional, since all messages are available to the entire membership of the online group. In small groups, an opening address is often redundant. In online educational courses, where the cohort is typically a group of twenty, direct address to an individual or group of individuals is therefore marked behaviour. Conversely, absence of a name or signature at the end of the message is also marked.

The second set of member methods consists of those that occur as part of an exchange. These are moves that are part of an adjacency pair, effect conversational repair or aizuchi. Use of adjacency pairs to maintain topic coherence and conversational coherence has been extensively documented in this thesis (section 2.2.2). However, although the term "adjacency pair" is used in the literature, this term refers not to an exchange of two speaking turns, but typically to an exchange of three turns. The typical structure of an adjacency pair is an initiation (turn 1), a response (turn 2) and an acknowledgment (turn 3). The third turn in the set is optional within certain speech events, hence the use of the term "adjacency pair". Nevertheless, in this study the coding will allow for three moves.

Conversational repair can occur in CMC contexts. Further, there is a higher incidence of self-repair in CMC, often presented as a separate message. This comes about due to the textual nature of communications and the permanence of the transcript. Only some

conferencing software systems permit users to delete or to edit their own messages after they have been sent, and as a consequence messages effecting self-repair are more prevalent than in audio-mediated communications. In this study, the coding will allow for two kinds of repair: other-directed repair and self-repair.

Aizuchi is the use of back channel signals to offer feedback to a speaker. This conversational move has no propositional content. In face-to-face interactions aizuchi can take the form of a nod of the head, a smile or murmuring of agreement. In CMC contexts, aizuchi can be conveyed through conventional phrasal responses, threaded to the original speaker's message, e.g. "Wow!" "Noooooo!" "Well done". Alternative ways to convey aizuchi in CMC include use of simple graphics, or emoticons, like smiley faces, or through embedded software tools such as voting tools.

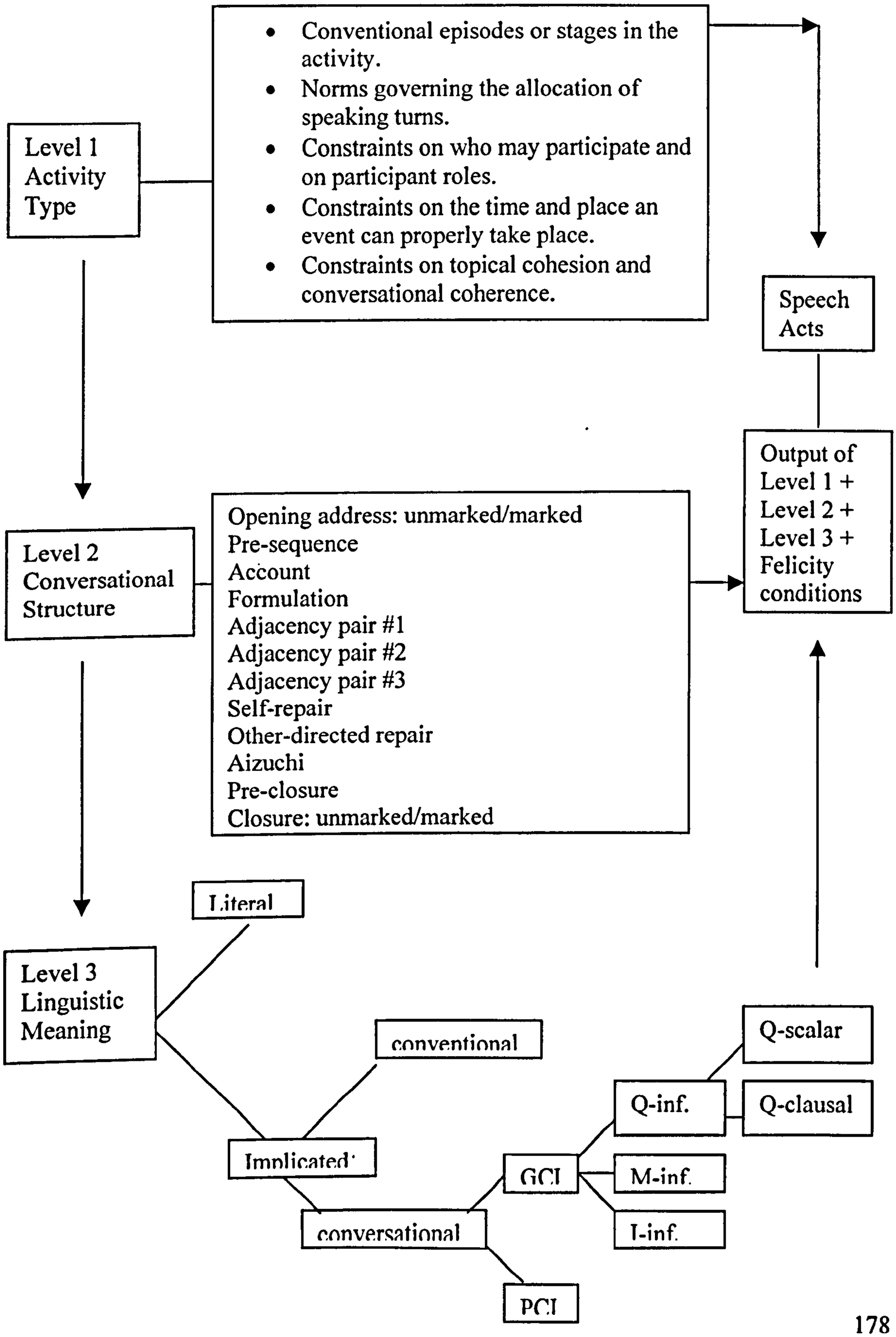
The third set of member methods consists of longer turns, typically accounts, formulations and self-formulations. There are no changes to be made, which are motivated by the CMC discourse context.

In conclusion few changes are apparently motivated by the description of the CMC context, which has been adopted in this thesis. However, it is anticipated that the way in which these conversational moves are used in CMC contexts may differ from the ways they are used in face-to-face conversation, as has proved to be the case with adjacency pairs for example. It is the task of this thesis to examine this question.

The Conversation Analysis coding categories used in this thesis are:

- Opening address: marked/unmarked
- Pre-sequence
- Account
- Formulation
- Adjacency pair #1
- Adjacency pair #2
- Adjacency pair #3
- Self-repair
- Other-directed repair
- Aizuchi
- Pre-closure
- Closure: unmarked/marked

4.4. THE ANALYTIC FRAMEWORK



4.5. USING THE FRAMEWORK

The first procedure in using the framework to code messages is to specify the nature of the activity type, using the five structural elements of Levinson's theory of activity types, as has been done in section 4.3.1. Moreover, these five elements can be used to provide a description of the activity at different levels of detail. The most general level specifies the nature of the activity and the rules of the language game. The first of Levinson's structural elements calls for specification of the conventional episodes and stages associated with the activity, which provides a closer level of specification for the goals of the interlocutors at certain points in the activity. An even finer level of specification can be provided with reference to the particular event being studied. In this thesis, the interlocutors are engaged in a co-operative task, which has been designed to consist of four sub-tasks, or stages (as described in section 5.2.2). The participants' conversational goals shift according to the stage of the task they are involved in. Thus, the description provided by the top level of the analytic framework is relevant to the coding for each message in the transcript, and needs to be calculated for every occasion of use.

The second procedure is to segment the message into its constituent conversational moves, using the Conversation Analysis categories in the mid-level of the analytic framework. The coding is performed through an intensive reading of each message to code the occurrence of the conversational move categories where present. Each occasion of use of a move is coded, therefore possibly resulting in a string of adjacency pair moves for example. Further, the header and title are also coded. The output is a profile of the structure of each individual message in terms of the conversational moves used. Where messages are obviously linked to other messages, through software threading, the use of the title or occurrence of a second or third part of an adjacency pair set, this information is recorded separately, for use as supplementary input to interpreting the speaker's meaning.

The third procedure is to pass each of the conversational moves coded for each message through the third level of the framework. This level of analysis is conducted using Levinson's (2000) revised version of Grice's theory of conversational meaning and gives an interpretation of the meaning of the move. The interpretation of meaning is made on the basis of the linguistic form and mode of expression alone at every branch of Levinson's framework, except the branch for a PCI, which has to be calculated individually and with reference to the context. The output of this third level in the framework is a preliminary interpretation of the meaning of each move in the message.

The next procedure is to enhance and refine the interpretation of meaning attributed to each conversational move by drawing on the information obtained at the two higher levels in the framework. This includes the predicted goals for the specific stage of the activity, the participant's role, and links to other messages, which can then be followed up to provide the local conversational context. The refined interpretation is recorded for each conversational move.

Finally, all of this information is combined in a summary of each message, which also records the main points of content, the speech acts performed and makes an estimate of the speaker's intentions. The summaries are useful in helping the researcher to track the overall progression of the conversations, as they combine to form a narrative of how each group behaved on the task.

4.6. Conclusion

The analytic framework, which will be used to conduct the coding for the research in this thesis, has been developed in this chapter. The design of the framework attempts to address the five issues, which were identified (section 2.4.6) as unresolved in the majority of frameworks currently available for the analysis of CMC discourse. The design specifically aims to address the difficulties of interpreting the form-function relationship in CMC messages and the fuzziness of definition of the unit of analysis.

The next stage of this research is to use the framework to code the messages in the transcripts, to collate the categories arising from the coding and to conduct the analysis. Chapter 5 reports on the research methodology used in this study and presents the results.

CHAPTER 5: RESEARCH METHODOLGY AND RESULTS

5.1 INTRODUCTION

The aims of this chapter are:

(i) To develop a methodology to provide a data-driven account of the discourse of adult CSCL groups.

(ii) To undertake a mini-trial of the analytic framework and methodology developed within this thesis by using the output to address a separate theory-driven research question. The question asked is whether the students in the discussion groups engage in a conversational approach to deep-level learning (Laurillard 1993, 2002).

The analytic framework, which forms the basis of the research methodology used in this study, was developed in chapter 4. It is based on Levinson's (1979) activity type, the traditional Conversation Analysis categories, and Levinson's (2000) neo-Gricean approach to pragmatics. When applied to the data, this framework created a profile of the structure, conversational moves and the forms of expression used in each message. This information was then used to generate an interpretation of speaker meaning, which is closely based upon the language forms and structures of the messages. These types of output from the framework provided a detailed representation of (i) how the participants in the CMC conferences managed and structured their discourse and (ii) the discourse strategies they used to convey meaning and to achieve their interactive goals. The information also revealed some of the discourse strategies the students used to question and reorganize their understanding of the learning material.

This chapter explains how the instrument was used to code the utterances of four online conferences, all of which were an online module in a University of London Masters degree course. Once the transcript data was coded, the analysis was conducted through intensive reading of the coded data and of the original transcripts to identify different categories of speaker behaviour. The categories were then collated to address the research

questions. Finally, the results of the analysis were recorded in an Excel database to provide a check on the validity of the categories and to undertake a simple form of quantitative analysis to map their distribution.

Section 5.2 describes the context for the conferences. This section also addresses the ways in which the data is a sample of online co-operative learning (CSCL), according to the criteria defined in the literature review (section 2.3.1). Section 5.3 discusses the method of data collection and how the ethical issues surrounding the use of online transcripts were resolved. In section 5.4 there is an account of how the instrument was piloted and of the modifications made to the application of the analytic framework and to the research methodology as a result of the pilot phase. A full account of the research methodology is given in section 5.5. The results of the analysis are presented in section 5.6.

5.2. THE DATA

The description of the data expands on the preliminary description provided for the discussion of the activity type for this research study in section 4.3.2. The description that follows in this section provides a closer specification of the activity type than presented in chapter 4, where the aim was to illustrate the use of the framework. The refined version is used in the analysis.

5.2.1 Context

The transcripts of the conferences, which form the data, are the transcripts of a fully online module in a University of London Masters degree in Education. The conferences, used as the data for this study, are the 2000 and 2001 presentations of the course.

The module spans two terms in duration (January–June), with an expected requirement of a minimum of six hours workload per week. Regular and active participation online is a requirement for completion of the module. This is one of the common procedures used by degree-awarding institutions to overcome irregularities in online participation.

The module is conducted fully online, using the First Class conferencing system, which is a text-based system. It is one of the software systems used quite widely in UK educational institutions; for instance the UK Open University has adopted it. The module does not rely on access to print-based materials, although there is a core and extended reading requirement. The Internet is used as a resource base and electronic materials are provided where required.

As one of the main objectives of the module is to enable students to design and run online courses, the pedagogical approach is process-based. The students are mentored online by the tutor who moderates the conferences. Following a procedure very similar to Salmon's five-stage model of conferencing (Salmon 2002:204), initially the tutor adopts a directive approach to moderation and moves gradationally to a facilitative approach to promote group co-operative learning and peer leadership. When the students are working in co-operative mode, as in the task analysed in this study, the tutor makes only infrequent direct interventions in the conference.

Although this is a small-scale course, with just one study group per year, the pedagogical model is duplicable, and the two year-group conferences of the data followed the same course programme and were taught by the same tutor.

5.2.2. The Co-operative Task

The data for this study was the second task of the module, when the students were required to work in co-operative groups for the first time. The task began in week four of the course and continued for four weeks. Students were placed in groups of three to six participants, and were led by a peer-co-ordinator. Each group had their own virtual workspace. The only criterion for placing the students was to ensure a reasonable mix of gender and age.

The task was to conduct an online interview with an expert in the field of online education. The groups were required to reach consensus on five or six questions on the topics of online course design and learner group management. Once the interview had

been conducted, the second part of the task was to agree on requests for clarifications, and finally to write a summary and commentary on the subject content of the interview.

This task is a combination of four task types, which are frequently used, in CMC learning environments (Paulsen 1995):

- group discussion
- group decision-making
- conversation with a subject expert
- joint writing task

The writing, discussion and decision-making aspects of the task were made co-operative by the requirement to arrive at a consensus (Slavin 1995, Johnson and Johnson 1994). Further, the procedures for the group work met many of the other criteria defined as typical of co-operative learning (section 2.3.1). Firstly, there was a shared goal (Shrage 1993). Secondly, the goal could only be properly achieved if the group members agreed on the requirements of the task and how to go about the task. To do this they needed to pool resources, offer constructive criticism, negotiate responsibilities and monitor the progress of the group (McConnell 2000). Thirdly, the outcome of the task was a jointly produced report. The reward of publication had to be attained by the group and not by an individual (Johnson and Johnson 1994). The task design therefore placed the onus on these students to pay attention to the co-operative process and to the academic content of their discussion.

The task was also designed to implement Laurillard's (2002) conversational approach to teaching and learning. (section 2.3.2). An earlier task in the course had already involved the students in reading and discussing the literature on online teaching and learning. The co-operative task, observed in this study, involved the students in applying this knowledge to question and critique practitioners. In Laurillard's terms the students were involved in apprehending the structure of the topic and integrating the parts into a mental representation of the challenges and main features of online teaching. To do so, they

relied on using feedback from their peers to reflect on their conceptualisation of the learning material.

The task presented an information-rich environment, where students had access to reflection on their own practice, the literature, subject experts and peer support. Moreover, because the task required the group to reach consensus on the interview questions, the individuals within the group found themselves in a dialogic cycle explaining, arguing and justifying their choice of interview topics and questions. Thus the conditions were set to encourage the type of iterative dialogue that is the paradigm of the conversational approach to learning (Laurillard 2002:86). The motivation to pursue the dialogue and to engage in deep-level learning (Marton and Saljo 1976, Marton and Booth 1997) was created by the desire to produce an interview scheme of a standard appropriate to an external expert and by the sense of competition existing between the different groups.

5.2.3. The Participants

As this is a postgraduate module in education, delivered entirely online, the student population was quite mixed. The student group included full-time and part-time students. Some part-time students were based in London, and some were based overseas. A number of the students were non-native speakers. The average ratio for gender mix is 2:1, and there were ten female and five male students in the online conferences analysed in this study.

The students needed four types of competence as prerequisite to achieve the task:

- Academic competence to understand and critique the learning material
- High level of competence in writing in English
- Competence in the activity type of UK university seminars (as discussed in section 4.3.1)
- Competence in online communications (described in section 2.2.1.2)

In this case, adequate levels of competence were assured in each of the first three competence types by virtue of the students' participation on a University of London Masters course. Further, the module occurred towards the latter half of the Masters degree course and the students had had time and opportunity to participate in a large variety of seminars and peer discussion groups.

With respect to competence in online communications, the students followed a two-week, online, pre-course training programme, and improved their skills through practice during the first four weeks of the course.

On the other hand, the students in this study did not receive training in the skills and techniques underlying successful co-operative group work, as advocated by Johnson and Johnson (1994). However, as the students are educationalists and many are practising teachers, they could be expected to have professional skills to enable them to succeed in a CSCL task.

5.3. DATA COLLECTION

5.3.1. The Transcripts

A complete copy of the transcript of each of the online discussions for each group was downloaded to the hard disk. The messages were sorted and organized by chronological order. However, wherever using the reply function in First Class had created a message thread, the thread was inserted as a complete set into the chronological sequence.

The only transcripts considered for the data analysis are the group discussions, which were accessible to all members of the course conference. Other one-to-one communications took place across a variety of channels, including face-to-face meetings, e-mail, First Class mailbox and First Class synchronous chat. These communications are not included in the data analysis.

Tolmie and Boyle (2000) observed that having a record of off-line communications can be critical for the researcher in forming an understanding of what is happening online. Nevertheless, in this study all communications that occurred outside the co-operative group discussion areas were excluded from the analysis whether they occurred in other open areas of the course conference or not. Each group discussion formed a bounded unit of a speech event in its own right (Grundy 2000:170-174). Moreover, each small group discussion was a shared resource, which could be reliably regarded as required reading for the members of the group.

There were also practical research considerations, which prevented the inclusion of other communications as data for this study. Firstly, there was the difficulty of the volume of data. As the aim of the research methodology was to make a detailed analysis, the volume of information needed to be restricted. Secondly, the methodology focused on arriving at an interpretation of speaker meaning by examining the speaker's choice of linguistic expression and discourse style. Consequently, non-linguistic types of information were not used to inform this interpretation. Thirdly, there were concerns over the reliability of recording some of the external communications. Computer-mediated conversations can be faithfully recorded as a transcript. It was less likely that records of serendipitous face-to-face meetings or telephone conversations made in hindsight would be sufficiently accurate to be used as data in this study.

5.3.2 Ethics

Permission to use the transcript for this research was sought from all the participants on the course. The procedure for obtaining informed consent from the learner groups was to post a message in the "noticeboard" area of the conference; and this is the recommended approach (Mann and Stewart 2000: 52). This message explained the nature of the research, the proposed method of analysis and the potential audiences. The participants in the conferences were requested to send a refusal to grant permission by private email. The message history was checked to ensure that all relevant parties had read it. No refusals were received. On the contrary, several students wrote to encourage the use of the transcript for research.

Anonymity is observed through the method of coding the messages (see section 5.5.3). Each message is allocated a number and location reference in the database. Further, wherever the participants give a name, it is replaced with a pseudonym. The anonymity of the interviewees is preserved by the convention of labelling each of the discussion transcripts by one of their initials.

5.3.3. Data Sample

The full set of data consisted of nine transcripts, made up of the five groups who did the task in 2000 and the four groups in 2001.

This volume needed to be reduced to a manageable corpus. Four of the transcripts were removed from the set, on the grounds that these groups did not manage to complete even the first part of the task (i.e. deciding on the interview questions). Lack of completion of even this stage entailed that these transcripts probably did not contain sufficient information relevant to the second part of this project on learning behaviour.

Of the remaining five transcripts, one was selected to pilot the analytic framework (see section 5.4). Of the final four transcripts, which make up the data for this study, two of the groups are from the year 2000 intake and two from the 2001 course intake. In all four groups there was a mix of gender and of age. In each group at least one member was a non-native speaker, and at least one member accessed the course from overseas.

There are 334 messages in the corpus used for the analysis. The distribution across the groups is mapped in table 5.1.

2000	**Number of messages**
A	83
R	57
2001	
D	125
H	69

Table 5.1: Distribution of messages across the transcripts.

5.4 THE PILOT STUDY

5.4.1 The Pilot

The analytic framework was piloted on sections of the M group transcript, from the 2000 course presentation. The sample consisted of twenty-one messages exchanged over fifteen days. The three group members contributed the majority of these messages. The tutor contributed five of the messages in the sample.

The analytic framework was used in a hierarchical manner, as described in section 4.5. Each message was coded by passing the message downwards through the framework from the most general level (activity type), to the mid level (message structure). The mid-level analysis provided a coding of the conversational moves within the message, which were entered as the units of analysis at the level of expression. The output of the coding recorded a profile of each message.

The pilot study supported the *a priori* modifications made (section 4.3.2) to the Conversation Analysis categories for use in a CMC environment. In summary, these modifications were to:

- include the message header or title as a conversational move
- specify as unmarked an opening address which is inclusive of all readers and the marked version an address which denotes a restricted audience
- specify use of a name or signature as the unmarked closure and the absence of a name as marked behaviour.
- allow for three exchanges within an adjacency pair "set"
- code two moves for conversational repair; other-directed repair and self-repair

Making the message equivalent to a speaking turn provided a natural unit of analysis at the top and mid-level of the analytic framework. Further, inheriting the coding of the conversational moves at the lowest level (Gricean analysis of meaning) avoided the difficulties of analysing unsystematic units and of making subjective judgements about what might constitute a unit of analysis at this level (section 2.4.6).

The pilot also supported the assumption that no modifications would be required to the neo-Gricean categories of conversational meaning.

However, the pilot study brought to attention a number of procedures that required modification. Firstly, certain of the operational procedures for applying the framework had to be more carefully specified. Secondly, the recording of the output had to be supplemented to enable the researcher to read the coherence of the conversation more easily.

5.4.2 Modifications to the framework

The pilot study revealed the need for clearer specification of a number of the conversational structure categories when applied to the data. These are addressed individually in bullet points below:

- *Distinguishing account and formulation*: The distinction between these categories is defined as a difference of levels of veracity. An account is a speaker-favoured representation of events (Grundy 2000:233). An account can be contested, but to do so challenges the speaker's conceptualisation of an event or idea. On the other hand, a formulation, which frequently follows an account, gives the speaker's version of the significance of the account and its consequences (Grundy 2000:189).
- *Appropriate coding of aizuchi*: To retain the original sense of aizuchi (Grundy 2000:189), the category should be restricted to content within messages where the only purpose is to signal the speaker's presence and attention.
- *Coding information from the subject header*: In the CMC context the subject header or title can carry informational content or function to maintain conversational coherence and topical cohesion (section 2.2.2.3). The header or title should be coded as a conversational move, but identification of the move type realized relies on local contextual information. Where two moves are apparently realized through one header, for example to establish a lexical cohesive link to another message through repeating the original title and to set the expectations of the reader (pre-sequence), then both moves are coded.

- *Identification of speech acts.* Identifying an element of the message as part of an adjacency pair and identifying the strings of adjacency pairs across message usually involves identifying the speech act performed. Identification of the speech act also plays a part in the interpretation of meaning at the level of expression. As the framework is intended to provide a linguistically motivated interpretation of meaning, a procedure was introduced to check on the interpretation of indirect speech acts, after the standard methods of interpreting the linguistic expression and checking the felicity conditions for the act had been applied. This procedure is the principle of coherence. The principle is to examine how the recipients interpreted the speech act, as revealed by subsequent utterances and or actions. The interpretation of subsequent actions, which provides the most consistent, or "coherent", representation of the event is favoured. An example from the data illustrates the procedure:

Text
A3#35:I would prefer that we delete Q8 and replace it with a question on assessment. We do not have one. I strongly recommend such a question, no matter how you prefer to word it. From L **A3#36:** I don't think it's possible to modify the questions as then we'd have to vote again. I must say I like Q8. from R **A4#5:** Dear L, you were right about my question. I'm sorry I didn't make more time for refining the questions as you suggested. **A4#8:** Working online as a group is also a challenge because some people may have quite strong views on issues but need to adhere to a group approach. I was a little too late with suggestions about some issues, which I knew needed refinement. The bottom line though is that it was all ok. L.
Reading **A3#35:** Student L uses both indirect and direct speech acts to make a strong recommendation **A3#36:** Co-ordinator R uses an indirect speech act to reject the proposal. **A4#5:** Co-ordinator R uses a direct speech act to apologise for her refusal. **A4#8:** Student L uses indirect and direct speech acts to accept the apology.

The final modification, as a result of the pilot, was to supplement the output string from the application of the framework with a brief textual summary, including the coding information and the speech acts performed and an account of the meaning conveyed by the message. The main purpose of the summary was to provide an easily accessible record of the interpretation of the message.

5.5. RESEARCH METHODOLOGY

5.5.1. Overview

The research methodology is based on the analysis of the data using the framework developed in chapter four. This framework is developed from a pragmatic view of the nature of meaning and of the procedures through which meaning is interpreted in conversation, as discussed in chapter three. The framework is composed of a set of three theories and also models the relationships between these theories, and, when applied to the text messages it makes an initial analysis and representation of the data.

The methodology consisted of four phases. The first phase was to code the data, using the analytic framework developed in chapter four.

The second phase was intensive reading of the coded data to derive categories for the analysis of the discourse. The specific aim of this phase of the research process was to map a profile of how the students used conversational structures and language forms to achieve their aims in this CMC environment. Nineteen discourse categories were identified in the data during this second phase.

The third phase aimed to test the framework by using its output as data for a theory-driven question. The question sought evidence of behaviours typical of the iterative dialogue that characterises the conversational model of learning, based on the phenomenographic approach (Marton and Booth 1997, Jones and Asensio 2002). The analysis proceeded on the basis of three broad categories, derived from Laurillard's set of requirements for learning (Laurillard 2001:86): accounts of conceptualisation of the

topic, questioning behaviour and the meta-cognitive activity of reflection on the learning process. The categories are refined and sub-categories are derived for questioning behaviour through an intensive reading of the coded data and the original transcripts. Six categories were found in the data.

The fourth phase was to record the results of the analysis in an Excel database spreadsheet. The twenty-five categories (nineteen discourse + six learning categories) were entered and all the messages were re-read and re-coded. Entering the data into the database in this way provided a check on the validity of the categories. It also permitted some simple quantifiable analysis. Further, the database provides readers of this research with a convenient means of access to the original transcripts, which are very lengthy and are stored electronically.

5.5.2. Unit of Analysis

The first unit of analysis is the message. The message is coded at the top (activity type) and mid-level of the framework (conversational structure). The output of the conversational structure coding is then inherited by the lowest level of the framework to provide an interpretation of the meaning of each conversational move. The final output of the analysis is a profile for each message of its structure and the forms of expression used to convey meaning.

5.5.3. Coding

The first coding task was to number the messages. Completing the cooperative task (section 5.2.2) involved completing five sub-tasks. These can be informally described as (i) getting organized, (ii) brainstorming, (iii) formulating questions, (iv) reflecting on the interviewee's response, (v) writing the summary. All four groups performed these sub-tasks, with varying degrees of success and it was possible to identify a cut-off point for each sub-task, which was applied consistently across the transcripts. This approach produced a useful 'rule of thumb' procedure to give a location address and number to each message. For example, R2#15 identifies message number 15 in sub-task 2 (brainstorming) of the R conference.

Each message in the transcripts was coded using the analytic framework. The framework consists of three levels: activity type, conversational structure of the message and the forms of expression used to convey meaning. These levels are ordered hierarchically so that lower levels are inclusive within the level above it. Coding is performed by applying each of the levels in turn, beginning with the highest level of generality. Passing each message through re-iterative cycles of the framework until all the relations between the information obtained from the different levels and components of the framework are satisfied performs the coding. The procedure is described below.

As a means to be able to define the aim of a message, Levinson's (1979, 1987) definition of an "Activity type" is used to describe the general communications context. The generic description of a post-graduate CSCL task was presented in section 4.3.1. This description was supplemented by the description of the data for this study (section 5.2). Moreover, the four discussion groups in this study had task-specific objectives to meet, in addition to the generic goals of the activity type, which even further narrows down the range of possible interpretations of speaker aim. The task design (5.2.2) imposed on them the requirement to persuade each other to agree on:

- their conceptualisation of the main issues of online teaching
- the fitness and relevance of the material proposed
- the formulation and expression of the interview questions and the summary
- procedures for working as a group.

On the basis of intensive reading the conversational aim of each message was described as directed towards one of these task-specific aims. This interpretation was refined through the process of passing the messages through re-iterative cycles of analysis.

The message as the unit of analysis was then entered into the second level of the framework. At this level the message was broken down into its structural constituent parts, representing the conversational structure of the message. This was done by using the standard definitions of the Conversation Analysis categories with some minor

adaptation to the CMC context (section 4.3.2) and with the modifications made as a result of the pilot study (section 5.4).

The first cycle of the coding was achieved by applying the standard definitions of the Conversational Analysis categories to the smallest stretch of text to which any of the definitions applies. There are several expert models for coding using the Conversational Analysis categories, and thus this was not a difficult task. However, identification of certain of the coding categories, and in particular the coding of adjacency pairs, involved making an initial hypothesis about the speech act performed. This was done partly with reference to the examples and procedures documented by the Conversational Analysts, and the work of Collot and Belmore (1996) who collated lists of adjacency pairs in CMC transcripts, and partly by making an interpretation of the form-function relationship, informed by the interpretation of the communicative goals provided by the first level of the framework.

Each conversational move coded was then entered to the third level of the framework, where an interpretation was made of the propositional content of the message and of the speaker's meaning on the basis of the forms of expression used. Coding at the level of utterance meaning was done using Grice's (1957,1967) original communications scheme for natural and non-natural meaning, supplemented by Levinson's (2000) set of heuristic principles for general conversational implicatures (as discussed in chapters 3 and 4). Coding of the particularized conversational implicature (PCI) category was done by loosely applying the Relevance theory principle (Sperber and Wilson 1986,1995) of seeking optimal relevance within the context of use.

Each move was coded. Further the coding categories permitted an interpretation of the meaning conveyed by each move. The meaning was interpreted by working out the propositional content on the basis of the semantic and grammatical information, by disambiguation of referential pronouns and terms, and by working out implicated meanings (GCIs and PCIs). Additional information inherited from the two higher levels in the framework provided information on the overall communicative goal, the types of

conversational move available to the speaker, the location of the move in the message (especially if an opening or closing move), the addressee, and the overall structure and length of the message. Further information could be gained through referring links to surrounding and otherwise linked messages, for example where a second or third part of an adjacency set occurs.

All of this information was collated to make a hypothesis about the speech act performed by the move, which included an interpretation of the speaker's intention and the propositional content. This interpretation was then refined applying a procedure based on the principle of coherence (section 5.4.2). The procedure was to examine the recipient's interpretation of the conversational move, as revealed by subsequent messages. The procedure also considered whether the felicity conditions for the speech act were in place and looked for levels of topical and interactional coherence with other messages to which the move in question was either threaded or lexically linked.

Therefore, the first output of the framework was an interpretation of the meaning conveyed by each conversational move in the message. This formed an initial hypothesis about the content of the message and the speaker's communicative aims, which could later be placed in the context of other messages in the sub-task set. This output was then re-entered to the first level of the framework and the framework was applied re-iteratively, until all the relations of all the information obtainable from passing the message through the framework were satisfied.

The final output of the coding procedure was an inferential interpretation of the conversational aim of the message, the structure of the message, an interpretation of the speech act performed by adjacency pairs, what meanings were conveyed and how meanings were conveyed indirectly. This information was summarised as an aide-memoire. The coding itself, on the basis of which most of the analysis was performed, was restricted to the categories within the second and third levels of the framework.

Examples of how the coding was performed are given in the next section (5.5.4). The following section (5.5.5) explains how the discourse categories were derived from the data. Section 5.5.6 discusses the discourse categories in detail. In this section, examples are provided using messages and extracts of messages from the transcript data. The examples are drawn from all four CSCL groups and, as can be noted by the location number for the messages, represent a spread across the different sub-tasks of the interview task. The aim is to present as wide a range of examples as possible.

5.5.4 Example of Coding

This section presents an example of the coding of the messages. This extract consists of twelve messages, which form what has been informally described as the brainstorming sub-task (section 5.5.3). The group is the D group. There are officially four members of the group. As will be seen in the following transcript, one group member does not contribute. The tutor is not included in the group membership. The students are all part-time and two are based in London and two overseas. Nick is the group co-ordinator.

This example is presented in the sequence in which the coding was performed. The first procedure is to represent the relationship of the messages in this sample. This is done by ordering the messages chronologically (by the computer recorded date and time), by representing the threaded clusters and by allocating a number and location address to each message. Each message is referred to in the analysis by the address number alone e.g. [D2#1- Nick- two ideas] is message 1 in the analysis below.

D2#1 Nick two ideas
D2#2 Kate Re: two ideas
D2#3 Nick Re: (2)[1] two ideas
D2#4 Kate Re: (3) two ideas

[1] The numbering of reference is a computer-generated number. It refers to the to the level of the message in the branching thread. Thus, Re (2) indicates the message is threaded to a response to the first message in the thread. Re (3) is a response to the response (Re (2). Therefore D2#10 and D2#11 are a different thread from the source "two ideas" message than the separate threads described as D2#1-D2#4 and D2#5-D2#6.

D2#5 Kate Re: two ideas
D2#6 Nick Re: (2) two ideas
D2#7 Nick QUESTION ONE
D2#8 Nick QUESTION TWO
D2#9 Nick QUESTION THREE
D2#10 Tutor Re: two ideas
D2#11 Nick Re: (2) two ideas
D2#12 Linda The task

The second procedure is to consider the detailed account of the activity type, as described in section 5.5.3. The students are working in small groups on a co-operative discussion task. Each group is led by a volunteer peer co-ordinator, who is authorised to manage and direct the group's activities. The requirement of the co-operative task is that they should jointly prepare a set of interview questions to be submitted to an expert in online education. In this sample the group is involved in deciding upon the questions that might be included in the interview (informally referred to as brainstorming). The participants are therefore discussing the topics they will include in the interview and also making arrangements for working together on this task. This brainstorming stage of the task ends when questions have been formulated.

The third procedure is the coding of each message using the analytic framework. The plain transcript of this sample is provided in Appendix I. The coding information presented here is the conversational move and an interpretation of the speech act performed, based upon the reading obtained from combining all three levels of information from the analytic framework. Brief notes are provided to explain the motivation for the reading in the column entitled "reasons".

The conversational move is identified in the first instance by identifying the smallest unit of text within the message, which satisfies any of the definitions of a conversational move, as defined by the standard Conversational Analysis methods. This procedure provides an initial segmentation of the message as the unit of analysis for more detailed

analysis. However, it does rely upon the reader's interpretation of the speech act performed, based in part upon the information inherited from the specification of the activity type and an interpretation of the speaker's goals, which this information contributes to. Each conversational move identified is then entered to the third level of the framework, and an interpretation of the meaning of the move is determined using Levinson's neo-Gricean theory of meaning. The interpretation of meaning based upon the form of expression provides additional information on the content of the move, the style of the utterance and the speaker's intention, which refines the interpretation of the speech act being performed, and often leads to verification or modification of the identification of conversational moves at the second level of framework. Thus, the interpretation of the conversational move is refined through passing the same text through more than one cycle of the analytic framework. Typically, an interpretation of the move would involve at least two or three cycles of the analytic framework until there is consistency between all the information made available from the different parts of the framework. This re-iterative process aims to address the difficulties of establishing an appropriate interpretation of meaning based on the form-function relationship, by providing a linguistically motivated reading, based in replicable procedures.

In this section within the transcript of the message, the analysis of the conversational moves is represented by a forward slash to mark both the beginning and the end of the move. Each move is then numbered and the number is placed in the coding table below the message. The coding string for each move is then presented for the move as numbered. However, as some of the messages were lengthy, these messages have been broken up into parts in order to make the procedure clearer for the reader.

CODING

MESSAGE 1.

Header:/two ideas/(1)

/Hello! /(2) /Nice to see things moving!/(3)

/Much impressed by (tutor's) analysis in Task 1, summary 2: the use of 'seminar talk'./(4) /So I'm trying to adopt it!/(5) /But as a teacher of English, there are things I have misgivings about./(6) /I'll come back to this./(7)

Message1/(1)-(7)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		
2	Unmarked opening address		addressed to all
3	Pre-sequence 1		
4	Pre-sequence 2		
5	Account		
6	Account	Account + Indirect speech act of disagreement	Speech act over lexis: "misgivings"
7	Account		

/I'm glad to be able to conjure up a more vivid picture of who we are, thanks to your messages, Linda and Kate./(8) /It was good to get back last night after a hard day's work and 'feel the group' coming together in those brief lines you wrote./(9) ?Anne, are you there?!/(10) /I reread your note in the cafe space, 8.1.01, which helps./(11) /Any more to add? I'm sure you have!/(12) /And finally, as regards our respective roles,/(13) /can I ask Kate if she would consider conducting the interview/(14), /since from what you say, Kate, in your message, you feel comfortable with that?/(15)

Message 1/(8)-(15)

Text	Conversational Move	Full Coding	Reasons
8	Adjacency pair 3	AP3+indirect expression of thanks	Thanks expressed as a complement
9	Account		
10	Adjacency pair 1	AP1 + indirect command	A co-ordinator's message, thus satisfying felicity conditions for command
11	Aizuchi		Acknowledges presence
12	Adjacency pair1	AP1+direct command	Felicity conditions satisfied
13	Pre-sequence		Change of topic

14	Adjacency pair 1	AP1+indirect command+ M-inference	M-inference over use of 3rd.person address
15	Adjacency pair 1	AP1 + request for confirmation	

/So to work/(16)/ /Here are a couple of initial ideas I've been mulling over./(17)

...../CMC: TIME AND SPACE TO THINK AND 'COMPOSE'/(18)

...../Here in France - don't know how it is elsewhere - learners in an English class are inhibited when having to enter into conversation with each other in a face-to-face context (f2f)./(19) . /They are afraid of appearing and sounding ridiculous in the eyes of their peers, and this diminishes their motivation./(20)

...../In my slight experience, in the past few weeks, seeing learners on my DE course here in Lyon interact via e-mail, I realize that this problem no longer exists./(21) /I wonder how one can best exploit this space that CMC represents, in which learners can express themselves without fear of ridicule./(22)

Message 1/(16)-(22)

Text	**Conversational Move**	**Full Coding**	**Reasons**
16	Pre-sequence		Orientation to content
17	Pre-sequence		*-as above-*
18	Pre-sequence		Title sets specific expectations
19	Account	Account + M-inference	Prolixity: "enter into conversation"
20	Formulation		
21	Account		
22	Formulation	Formulation + M-Inference	Formulates relevance of account (move 21) M-inference over "one" in preference to anticipated passive voice.

……./In more concrete terms, my question would be this./(23)……/The asynchronous exchange of messages in CMC allows learners:

1. MORE TIME to construct their ideas;/(24)

……./2. A MEANS of formulating these same ideas - i.e. WRITTEN not SPOKEN - in such a way that errors in language or syntax cause less embarrassment, and in the long run hamper communication less than they would in a f2f context;/(25)

……./3. THE OPPORTUNITY to 'polish' their linguistic output before delivering it to others./(26)

……./How does one construct a DE course in English using CMC in such a way as to build on these specific advantages of the tool that CMC represents?/(27)

……./I wonder if Linda feels the same about this from her experience?/(28)

Message1/(23-(28)

Text	Conversational Move	Full Coding	Reasons
23	Pre-sequence		
24	Account		
25	Account		
26	Account		
27	Formulation	Formulation + M-inference	Formulation, as rhetorical question, as to possible interview question. M-inference over use of term "one" in preference to passive voice
28	Adjacency pair 1	AP1+ Indirect request for feedback+ M-inference	M-inference over use of 3d. person address.

…./MANAGING CORRECTIONS/(29)

…./Again, watching my learners, I realize that the quality of the English that 'circulates' can be poor./(30) /But let me say immediately that I am no amateur of the red pen and underlining mistakes three times!/(31) /My rule of thumb is that if the message is successfully conveyed - be it orally or in writing - then correction of mistakes should be kept to a minimum to avoid demotivating the learner./(32) /However, in this new age of

'global English' (or global English?) that we are entering on the net, all niceties of spelling and punctuation seem to be vanishing before our eyes!/(33) /How does the moderator of a DE course in English cope with this?/(34)

...../To illustrate this point, I cannot resist pasting in (tutor's) last message to us here. I hope she will not take it amiss!

'I'm sorry to put you in a group where you have no sepcial epertise, but theer are two reasosn for this:/ (35)

...../It made me smile./(36) /I understood the message, so there was no problem./(37) /But what if the message comes from the learner of English. Where do you draw the line?/(38) I always strongly advise all my learners to use the spellcheck in word processing programmes./ (39) /Am I right?/(40)

Message1/(29)-(40)

Text	Conversational Move	Full Coding	Reasons
29	Pre-sequence		
30	Account		
31	Account		
32	Formulation	Formulation + I-inference	I-inference over use of conditional sentence frame: subjunctive mood
33	Account	Account + M-inference	M-inference crafted by the speaker through contrastive punctuation of "global English".
34	Formulation		Rhetorical question that formulates the issue.
35	Account		Direct quotation
36	Account		
37	Account		
38	Formulation		Rhetorical question that formulates the issue
39	Account		
40	Adjacency pair 1		Request for feedback

...../Can you, Kate, Anne and Linda, see ways of posing these problems more succinctly./(41) /I feel a bit bogged down in details./(42) /I look forward nonetheless to building on these and other thoughts with you to get our questions together!/(43)...../Just one week to go!/(44)

Message1/(41)-(45)

Text	Conversational Move	Full Coding	Reasons
41	Adjacency pair 1	AP1+ direct command	Felicity conditions satisfied
42	Account	Account + Indirect proposition	Indirect proposition that speaker is unable to clarify the questions. Complementary to (41)
43	Pre-closure 1		
44	Pre-closure 2		
45	Marked closure		No name

MESSAGE 2

Header /Re:two ideas/(1)
/.. /(2) /Yes I am happy to conduct the interview Nick./(3) /I have read your two questions and made notes/(4) /- after reflection I will respond tomorrow/(5) /and hopefully add an additional question proposal./(6)

.../Kate/(7)

Message 2/(1)-(7)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		Threaded title
2	Unmarked opening address		No address/by default to all
3	Adjacency pair 2	AP2+ direct speech act of acceptance/agreement	AP2 to AP1 Message1/(14)
4	Pre-sequence	Pre-sequence + aizuchi	Acknowledges Nick's message
5	Adjacency pair2	AP2 + direct speech act of commitment to action	AP2 to AP1 Message1/(14)

6	Pre-closure		
7	Unmarked closure		Name

Message 3

Header /Re(2) two ideas/(1)
/ /(2) /So nice to hear back and so quick, Kate - great!/(3)
/And since yesterday, I've been wondering whether you, Kate and Anne, have access to the texts in the bibliography that (tutor) recommends./(4) /As you know Linda and I do not./(5) /Perhaps if either of you have read something, it would be helpful if you told us what is worth reading./(6) /I'm contemplating ordering a very limited number of books and would welcome advice on what to buy./(7) / Is there no 'bible' on CMC?!/(8)
/Nick/(9)
/PS Copy of this request to (tutor)/(10)

Message 3/(1)-(10)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		Threaded title
2	Unmarked opening address		No address/ default
3	Adjacency pair3	AP3 + direct expression of emotion + M-inference	AP3 to AP2 Message2/(5). M-inference over repetition of "so"
4	Pre-sequence		
5	Account		Makes explicit group's shared knowledge, as pre-sequence to request
6	Adjacency pair 1	AP1 + indirect speech act of request + I-inference + Q-scalar inference	I-inference over either (+/- both) Q-scalar inference over "something" (some not all)
7	Adjacency pair 1	AP1 + indirect request for information + M-inference	M-inference over repetition of request
8	Adjacency pair 1	AP1 + direct request for information	
9	Unmarked closure		Name

10	Adjacency pair 1	AP1 + indirect request for information + M-inference	M-inference over repetition of request

Message 4

Header:/Re(3) two ideas/(1)

/ /(2) /The only book I have managed to get hold of so far was on the first reading list - Implementing Computer Supported Cooperative Learning by David McConnell./(3) /It was first published in 1994 with an updated second edition in 2000./(4) /It is good in the sense that it is easy to read and covers many of the issues related to cmc - tutoring, dynamics of group work, designing for cmc./(5) /It also has a first section on 'what is co-operative learning?'/(6) /which I found useful in a general context sort of way./(7) /Towards the end he has a chapter on 'Trends and Developments'/(8) /which is presumably the update/(9) - /I haven't got to it yet but it includes : Networked lifelong learning, Just in Time Learning, IT based Open Learning./(10) /I am no expert but I would guess that this would serve well as a general reference text./(11)

/Kate/(12)

Message 4/(1)-(12)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		Threaded title
2	Unmarked opening address		No address/by default to all
3	Account	Account + I-inference	I-inference over "managed"=+effort
4	Account		
5	Formulation		Reviews relevance of the book.
6	Account		
7	Formulation		Opinion
8	Account		
9	Formulation		Comment
10	Account		
11	Formulation/(Adjacency pair2)		Opinion and summary of review. AP2 to Message3/(8)
12	Unmarked closure		Name

MESSAGE 5

Header:/Re:two ideas/(1)
(2) /After thinking about the first of your questions Nick (more time, polish linguistic output before delivery etc)/(3...../I wonder whether it wouldn't be better to open it up a bit./(4) /Mason (did you manage to access this paper?) identifies what he terms' backbone elements' to online courses - asynchronous communication, real-time interaction and access to materials./(5) /I was thinking that perhaps we could ask/(6) /- What criteria do you use as a course designer in deciding on the balance of these three elements?/(7) /In this way we are setting your thoughts on asynchronous communication in a more general context/(8) /but I feel we might glean additional material in her answer that we are not aware of./(9) /If, however, the broadening of the question produced an answer that you felt missed the point then we are able to go back once for clarification anyway./(10)

Message5/(1)-(10)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		Threaded title
2	Unmarked opening address		No address/by default to all
3	Pre-sequence	Pre-sequence + embedded account	Embedded account is a cohesive echo (repetition) to Message1/(24) (25) (26)
4	Adjacency pair2	AP2 + indirect speech act of suggestion + M-inference	AP2 to Message1/(41) M-inference by prolixity of expression
5	Account	Account + [embedded adjacency pair 1 + direct request for information]	
6	Adjacency pair1	AP1+ indirect speech act of suggestion + M-inference	M-inference by prolixity of expression and modality
7	Account		
8	Account		
9	Formulation		States rationale for modification to the question

10	Account	Account + I-inference	I-inference over conditional sentence frame

/My thoughts on the second question are not so developed/(11) /but it seems to me that in your concern about correction you are starting to look at balancing accuracy and control against involvement and interactive confidence/(12...../this is a very important aspect I think which may impinge on task creation and assessment within overall course design./(13)

Message5/(11)-(13)

Text	Conversational Move	Full Coding	Reasons
11	Pre-sequence		Referential link ("the second question") to Message1/(34) (38)
12	Account	Account + Q-clausal inference	Q-clausal inference of epistemic uncertainty: "It seems to me"
13	Formulation		Assesses relevance and significance of the question

/One last thought is a possible third question/(14) -/How can you develop a sense of community on an online course, which is based on the Just in Time principle and has students joining and leaving at different times?/(15)

/That's all for now/(16)

/Kate/(17)

Message5/(14)-(17)

Text	Conversational Move	Full Coding	Reasons
14	Pre-sequence	Pre-sequence + indirect speech act of suggestion	Suggestion made through lexis: "possible"
15	Account		
16	Pre-closure		
17	Unmarked closure		Name

Message 6

Header:/Re(2) two ideas/(1)
/ /(2) /Many thanks, Kate, for your reply./(3) /Have decided to break up our thread to make it easier for the others to 'jump in'./(4)

/Nick/(5)

/PS Yes, have read Mason./(6) / I must re-read./(7)

./PPS Many thanks for recommending the McConnell book./(8)

Message6/(1)-(8)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		Threaded title
2	Unmarked opening address		No address/by default to all
3	Adjacency pair3	AP3 + direct expression of emotion	AP3 to Message5/(4)
4	Account	Account + indirect speech act of request for participation + Q-scalar inference	Indirect speech act of request made through felicity conditions for co-ordinator + requirements of the CSCL activity. Q-scalar inference: the others v zero realization
5	Unmarked closure		Name
6	Adjacency pair 2		AP2 to Message5/(5)
7	Account		
8	Adjacency pair 3		AP3 to Message 4 + Message4/(11)

Message 7

Header:/QUESTION ONE/(1)
/QUESTION ONE/(2)

/...../(3) /I agree we need to widen this question./(4) /But can we not weave in a small slant to those three points - asynchronous communication, real-time interaction and access to materials - to try and 'nail down' what I'm getting at?/(5)

/I do wholeheartedly agree that we have the clarification safety net to narrow down a point,/(6) /but if in her answer (the interviewee) doesn't broach what I'm getting at, I'm afraid it might slip thro our fingers!/(7). /What about keeping your three points and building in a slightly more complex question?/(8) /Or am I being too pushy?!/(9) /Over to you!/(10) …/…./(11)

Message7/(1)-(11)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		Referential link to Message5/(3)
2	Pre-sequence	Pre-sequence + M-inference	M-inference through direct repetition + use of capitals for emphasis
3	Unmarked opening address		No addressee(s)
4	Adjacency pair3	AP3 + direct speech act of agreement	AP3 to Message 5/(3) + cohesive reiteration of original "open (the question) up" "to widen this question"
5	Adjacency pair1	AP1 + indirect speech act of recommendation	+ embedded quotation from Message5/(5)
6	Adjacency pair 2	AP2 + direct speech act of agreement	AP2 to Message5/(10)
7	Formulation	Formulation + I-inference	Formulation offers rationale for speech act in (5). I-inference through use of conditional sentence frame
8	Adjacency pair 1	AP1 + direct speech act of suggestion	
9	Adjacency pair 1	AP1 + indirect proposition	
10	Pre-closure	Pre-closure + indirect request for feedback	
11	Marked closure		No name

Message 8

Header:/ QUESTION TWO/(1)
/QUESTION TWO/(2)

/ /(3) /Let's keep thinking!/(4) ../ /(5)

Message8/(1)-(5)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		Referential link to Message5/(11)
2	Pre-sequence	Pre-sequence + M-inference	M-inference through direct repetition + use of capitals for emphasis
3	Unmarked opening address		No addressee
4	Adjacency pair 2	AP2 + indirect speech act of agreement	AP2 to Message 5/(12) (13)
5	Marked closure		No name

Message 9

Header: /QUESTION THREE/(1)
/QUESTION THREE/(2)

/ /(3) /I'd like to explore this point too./(4) /Will get back to you Tuesday when I'm back home with time to muse./(5) / /(6)

Message9/(1)-(6)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		Referential link to Message5/(14)
2	Pre-sequence	Pre-sequence + M-inference	M-inference through direct repetition + use of capitals for emphasis
3	Unmarked opening address		No addressee
4	Adjacency pair 2	AP2 + indirect speech act of agreement	Anaphoric link ("this point") to Message5/(15)
5	Adjacency pair 1	AP1 + direct speech act of commitment to action	
6	Marked closure		No name

Message 10

Header ;/Re: two ideas/(1)
/ /(2) /The bibles of CMC teaching are:

1. McConnell's book: Implementing Computer Supported Collaborative Learning (well-spotted Kate!)

2. Salmon: E-moderating/(3)

/There is also the Moderator's Home Page, and McConnell's project home -page at Sheffield University./(4) /I will get the URL's for these to you tomorrow,/(5) /but I wanted to make a quick response./(6)

/Apologies for my sloppy editing./(7) /(name of tutor)/(8)

Message 10/(1)-(8)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		Threaded title + message is AP2 to Message3/(10)
2	Unmarked opening address		No addressee
3	Account	Account + embedded direct speech act of praise, referentially linked to Message4/(11)	Direct repetition of lexis ("bible") from Message3/(8)
4	Account	Account + I-inference	I-inference over "and" = either or both.
5	Adjacency pair 1	AP1 + direct speech act of commitment to action	
6	Adjacency pair 1	AP1 + indirect apology	
7	Adjacency pair 2	AP2 + PCI	Ap2 to Message1/(35) PCI over joke made about tutor's typing errors, as used to illustrate an issue.
8	Unmarked closure		Name

Message 11

Header: /Re(2) two ideas/(1))
/Many thanks,/(2) /(tutor)./(3) /I shall order them immediately!/(4)

/'Sloppy editing' is edifying, you know - despite what you say./(5)

/Best wishes,/(6)

/Nick/(7)

Message11/(1)-(7)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		Threaded title
2	Marked opening address		Message addressed to tutor alone
3	Adjacency pair 3	AP3 + direct speech act of thanks	AP3 to Message10/(3)
4	Account		
5	Adjacency pair 3	AP3 + M-inference + PCI	AP3 to Message10/(7) + direct quotation of 'sloppy editing'. M-inference over semantic field of edit/edify. PCI from semantic pun on edit/edifying + continued from Message 1 and Message 10
6	Pre-closure		
7	Unmarked closure		Name

Message 12

Header: /The task/(1)
/Hi Group,/(2)

/I've been reading your contributions/(3) /and I wanted to explore a few points further./(4) /How does (the interviewee) encourage fluency in speaking the language if she relies primarily on E mail?/(5)

Message12/(1)-(5)

Text	Conversational Move	Full Coding	Reasons
1	Pre-sequence		New title
2	Unmarked opening address		Addressed to all group members
3	Aizuchi	Aizuchi + Q-clausal inference	Q-clausal inference over progressive perfect verb tense expressing continuity over a period of time/ contrastive with simple perfect tense.
4	Pre-sequence		Sets expectations for the message
5	Account		Rhetorical question that is the topic sentence for the paragraph and for moves (7) to (13) inclusive.

/One medium that is mentioned in the course outline is the use of video./(6) /How does she use this medium?/(7) /Does she use it to capture non-verbal as well as verbal communication and the intonations of different speakers of English?/(8) /What other media does she use and how does she integrate them?/(9) /Does she encourage her students to listen to the language as it is spoken on television programmes or audio cassettes or radio programmes?/(10) /Do her students listen to the language as it is spoken around the world?/(11) Are the students ever placed in situations where they have to perform the role of interpreter at a conference?/(12) /Does she set them questions that require them to listen to segments of the spoken word and then formulate replies using the Email?/(13).

Message12/(6)-(13)

Text	Conversational Move	Full Coding	Reasons
6	Account		Referential link to "the course outline"-a document given to the group.
7	Account		Rhetorical question to set frame for explanation in move (8) of the issue addressed.
8	Formulation	Formulation + M-inference	Identifies and clarifies issue introduced by account in move (7) M-inference over "as well as" makes explicit the inclusive use of 'and' that would be conveyed by the unmarked I-inference
9	Account		Rhetorical question to set frame for explanation in moves (10) to (13 inclusive of the issues addressed
10	Formulation		Identifies and clarifies issue introduced by account in move (9)
11	Formulation		*-as above-*
12	Formulation		*-as above-*
13	Formulation	Formulation + M-inference	Identifies and clarifies issue introduced by account in move (9) M-inference over "and then" makes explicit the temporal implication of 'and'. unmarked I-inference

/In short, what other media does she use to promote fluency in speaking the language?/(14) /How does she integrate these other media in her course?/(15) /How does she balance the theoretical and the practical aspects of the course?/(16)

Message12/(14-(16)

Text	Conversational Move	Full Coding	Reasons
14	Account		Summary of rhetorical questions (moves 7-13) expressed as interview questions
15	Account		*-as above-*
16	Account		*-as above-*

/From the course outline, she also sets herself the goal of developing the capacity to take part in institutional planning and to direct English teaching and teacher training./(17) /She also addresses issues such as dyslexia/(18) ./This would seem to require some networking with teacher training institutions around the world and with special educators and linguists/(19) /How does she achieve this within the context of an online course that relies on Email?/(20) /Obviously their input would be important in developing course materials but does their participation end there?/(21)

Message12/(17)-(21)

Text	Conversational Move	Full Coding	Reasons
17	Account		Referential link to the course outline
18	Account	Account + M-inference	M-inference over direct repetition of "also" from move (17)
19	Formulation	Formulation + Q-clausal inference	Identifies issue underlying accounts (17) and (18) Q-clausal inference of epistemic uncertainty over "this would seem to.."
20	Account		

21	Formulation	Formulation + indirect proposition	Indirect proposition that email insufficient for negotiations beyond materials development

/Lastly, what strengths and weaknesses has she encountered in using the Internet and Email as one of her principal modes of delivery?/(22)

/Linda/(23)

Message12/(22)-(23)

Text	Conversational Move	Full Coding	Reasons
22	Account		An interview question
23	Unmarked closure		Name

5.5.5 Deriving the Discourse Categories from the Coding

Intensive reading of the coded data was conducted in order to detect any emergent, consistent patterns. To address the research questions of this thesis, particular attention was given to examining the existence of patterns in:

- the ordering and configuration of Conversational Analysis categories within messages
- the use of socially-oriented Conversational Analysis categories: openers, closures, aizuchi
- the use of conversational management Conversational Analysis categories: repair and adjacency pairs
- implicated meaning and the use of the three types of GCI
- the use of direct speech acts (literal meaning)
- the means through which topical cohesion and conversational coherence are sustained

Various patterns were observed in the occurrence and distribution of the coding categories on all six of these points. In all, nineteen discourse categories were identified, each representing a distinct pattern of behaviour. The qualitative analysis of the coded data, performed through entering the categories into an Excel database (Appendix III), shows that the large majority of these categories occurred across at least approximately one-fifth of all the messages in the sample. This section presents the method for deriving the categories from the coding. A detailed discussion and exposition of the categories is presented in the next section.

Intensive reading and comparison of the coding categories at the level of the message, as presented in section 5.5.4, identified four distinct patterns in the way messages were structured. Further, these structural patterns were closely associated with the extent to which implicated meaning was conveyed through the use of the GCI categories, and the extent to which anaphoric reference was made through use of pronouns, or elliptical expressions, that require pragmatic inferences to be made to disambiguate the meaning.

One type consists of the standard structure for CMC messages, as identified by Herring (1996). This consists of a header to orient the reader to the topic, an opening address, the body of the message where information conveyed and a closure. This first type makes few anaphoric references to other messages. A second type is structured almost exclusively as a string of adjacency pairs. A third type has the same standard structure as the first, but is differently characterized as it contains extensive use of pronouns, anaphoric references and elliptical phrases and displays inter-textuality with other messages in the on-line discussion. The third type also contains implicatures expressed through GCI. The fourth type of message structure predominantly consists of the account and formulation categories. Where implicated meaning is conveyed, this is usually followed by an elaborated explanation of the intention. The fourth type also contains relatively high levels of Q-clausal and Q-scalar implicatures, expressing lack of commitment to the truth of the statements being made.

Further examination revealed that the second type of message structure (adjacency pairs) could be sub-divided into one sub-set that conveyed direct and indirect speech acts with a social or emotional content, aizuchi, and a second sub-set that conveyed direct and indirect speech acts to offer advice, suggestions, to request feedback or to effect a repair move. It was also observed that some messages were actually multiple messages, and contained more than one of the structure types within the physical boundary of the message. This was referred to as a mixed message structure type.

The six types of message structure are the first six discourse categories.

Consideration of the socially–oriented Conversational Analysis categories indicated that opening and closing moves are included within all of the six discourse categories for the message structure types. Analysis of these message structures would therefore perform the analysis for these two moves. However, aizuchi is a separate move coded by the framework, and thus makes up a discourse category (category 7).

Similarly, the adjacency pair move is included in all of the six message types. The repair move, on the other hand, is not accounted for by the message structures. Three conversational repair categories were identified as relatively prevalent in the data. One is a false repair, where the speaker suggests a misunderstanding has occurred to achieve another aim. This category was identified using the principle of coherence to interpret the speech act. It is treated in this analysis as a form of indirect expression of meaning and thus forms a separate category (category 8). The two other conversational repair moves identified by the coding of the framework are self–repair (category 18) and other-directed repair (category 19).

Examination of the use of the use of the three GCI codes showed that there was no fixed correlation between the extent to which GCIs occurred in the different message types, or the location of a GCI within any of the message structures. GCI is a property of the form of expression and occurs at the level of the speaker's choice of language. It is especially associated with the expression of indirect speech acts. Four discourse categories were

identified on the basis of finding patterns in the coding performed through the implicated meaning branch of the third level of the framework.

One pattern observed was the use of Q-clausal and Q-scalar implicatures to express lack of certainty or authority with respect to the information conveyed. "If we simplify the question, the point should be clearer" is an example of a Q-scalar implicature used for this communicative purpose. A similar communicative effect is achieved by a Q-scalar implicature over modal verbs of probability (e.g. may, might). This communicative use of the Q-principle implicature is referred to as epistemic uncertainty (category 9).

The GCI coding of the framework also aims to provide a linguistically motivated reading of indirect meaning, mainly through interpreting implicatures arising from the Q-principle and the I-principle. Two main types of indirect meaning were consistently found in this data; indirect speech acts directed at the management of the task and implicated propositional content. This provided two further discourse categories, indirect command (category 10) and indirect proposition (category 11).

The third level of the framework also codes direct speech acts (literal meaning). Whilst a number of different types of direct speech acts were found in the data there were consistent patterns for only three types: direct requests for feedback (category 12), the co-ordinator's direct commands to the group (category 13), and direct expressions of emotion, to express thanks, congratulations, emotional support etc. (category 14).

The final task was to examine how topical cohesion and interactional coherence is sustained across the messages. This involved a shift in approach from looking for repeated patterns at the level of the message, to looking for patterns across messages embedded within the coding. The first and most obvious strategy for cohesion and coherence, identified in the literature (Davis and Brewer 1997, Herring 1999), is the use of adjacency pairs. However, as this move is observable and trackable within the message structure categories a separate analytic category is not required.

Nevertheless, two other repeated patterns were observed. One is anaphoric reference that is identified by the framework at the third level as part of the process of disambiguating referential meaning. As already observed by Crystal (2001) and Herring (1996) anaphoric reference can occur in the header to orient the reader, or can occur in the body of the message, as an explicit reference or an indirect reference (category 17). One further pattern was observed in this data. This was the strategy of making a link to other messages through echoing (in exact or synonymous repetition) parts of another message. On some occasions the echo took the form of mimicking the topical structure of an earlier message. Four strategies of cohesive echo (category 16) were observed in this data. Two are relatively standard; the repetition or near repetition of words or phrases in, and the direct repetition (electronic copying) of chunks of text from a previous message. Both typically occur in accounts, formulations and repair moves to discuss the subject matter. The two other strategies observed are echoing of a header (other than through computer-threading) and echoing the topic structure of previous messages as in the examples below.

Example 1: Echo- Header

All contributed by student S

R1#2	Starting Out
R1#3	Getting There
R2#8	Continuing

Example 2: Echo –Header

A3#4	student P	Questions
A3#16	student L	Questions
A3#17	student R	Questions
A3#18	student R	Refining the questions
A3#23	student A	Questions

Example 3: Echo – Topic structure

A5#11- Student L -Header " Many thanks"

Adjacency pair 1	Direct speech act of thanks to group
Adjacency pair 1	Indirect speech act of congratulations to co-ordinator
Adjacency pair 1	Direct request for information on next course task ("What next")
Name	

A5#12-Student J- threaded to A5#11

Adjacency pair 1	Indirect speech act of thanks to group and co-ordinator
Adjacency pair 1	Direct request for information on next course task ("What next")
Name	

A5#13-Student R (co-ordinator) - Header "Thanks again and what next"

Adjacency pair 1	Direct speech act of thanks to group
Adjacency pair 1	Direct speech act of thanks to group (repeated action)
Account	Information on next course task
Adjacency pair 1	Direct speech act of thanks to student L
Name	

A5#14 Student A- threaded to A5#13

Adjacency pair 1	Indirect speech act of thanks to co-ordinator
Adjacency pair 1	Indirect speech act of thanks to group
Account	Assessment of the group process
Adjacency pair 1	Asks student L about a recent holiday

5.5.6. Discourse Analysis Categories

The reading of the coded data identified nineteen categories of speaker behaviour. The categories were then collated to address the research objective: to arrive at a data-driven description of electronic discourse. The nineteen categories cover four aspects of discourse:

- Four distinctive and functionally specific types of message structure were identified. Two sub-types were identified, which resulted in six coding categories for the message types (categories 1-6)
- Patterns in the use of indirectness (categories 7-12) and directness (categories 13-15) and in the use of CGI to realize the writer's conversational aims
- Patterns of cohesion and coherence (categories 16-17)
- Use of conversational strategies of repair (categories 18-19)

5.5.6.1 Message types:

The message types are categories 1-6. The six coding categories are derived from the four basic message types found in the data. The data showed four distinctive types of message structure, which are used to convey a basic communicative function: (a) default/neutral, (b) interactive, (c) conveying given information, (d) conveying new or risky information. Each type differs in the configuration of the Conversation Analysis categories, which make up the structure of the message and in the extent and manner in which Levinson's GCI categories are used.

The messages also differ in the extent to which they are textual, in the sense that textual messages display features typically associated with written texts. A highly textual message will be lexically dense with a high degree of nominalization (Halliday 1985, Yates 1993). It will be structured around a series of pre-sequences, which act like headings and sub-headings, will make few or no pro-nominal or elliptical references to events, people or messages external to itself, and make limited use of Levinson's GCI. Those messages conveying new or risky information tend to be most textual. It was observed that textuality is different from crafting. An informal and conversational

message, typically conveyed as an interactive-directive message, could be crafted, in the sense that it was carefully constructed e.g. contained a pun or a joke, but it would not be textual (in the sense of lexical density).

The information content of the message, the speech acts performed and the choice of expression used to convey meaning are persuasive functions overlaid on to the basic structures. For example, a message that displays a default structure is typically used to open the discussion or to act as a conduit for text attachments. It is a neutral template for the presentation of uncontroversial information. In contrast, an interactive structure can be used to perform a variety of speech acts, such as offering praise, giving thanks, requesting contributions, making suggestions for group procedures or making jokes.

The four message types make up six of the nineteen discourse analysis categories identified from the data. The extra two categories are derived from evidence of two significant variant offshoots from the four basic message types. The interactive category breaks down into two sub-types of interactive messages. One sub-type has a social orientation (for example to give praise, to acknowledge presence or to give thanks) and the other a directive orientation (to propose procedures for the group work or to request action from other group members). There is also an additional category of mixed message types (category six). A mixed message type is defined as a message in which more than one of the four basic communicative message types occurs within a single message. This typically occurs when the speaker deals with multiple topic threads, or with multiple actions in relation to other group members, in one message. This type of message is most typically sent by group co-ordinators after a period of activity.

Tables 5.2.and 5.3 show the structure and core features of each of the message types. One example of each message type is given in Appendix II.

	Type 1 Default	Type 2 Interactive	Type 3 Given information	Type 4 New or risky information
Structure	Header Opening address {Account…n} Adjacency pair/Pre-closure Closure Name	Header <Opening address> <Pre-sequence> Adjacency pair Adjacency pair…..n <Formulation> Pre-closure Closure Name	Header <Opening address> Account Account…..n <Formulation> Adjacency pair/Pre-closure Unmarked closure Name	Header <Opening address> Pre-sequence Account Formulation Account n Formulation <Pre-closure> <Closure> Name

Table 5.2. Basic message types: Structure
Key: < > indicates the conversational move is optional

Message Type	Core Features
Type 1/Default	(i) Requests for feedback (pre-closure) usually indirect and of the generic "would you…", "could you…." type. (ii) It is standard procedure to close with a pre-closure/adjacency pair to elicit comments.
Type 2a/interactive-social	(i) Not highly textual, although may be highly crafted. (ii) Will use most standard forms of GCI and some PCIs (iii) Frequently part of an adjacency pair set (iv) The content of the message is socially oriented.
Type 2b/Interactive directive	(i) Not highly textual, although may be highly crafted (ii) Will use some standard forms of GCI and some PCIs (iii) Frequently part of an adjacency pair set. (iv) The content of the message aims to bring about a change of attitude or action in the recipient(s).
Type 3/Given information type	(i) The information content concerns what is presumed as accepted or common knowledge, typically a summary of work-in progress. (ii) Standard use of GCI, but generally few implicatures occur. (iii) Extensive use of pronouns, elliptical phrases and referential anaphora within the message and across messages.[2] (iv) Header often provides topical coherence and links to other messages.[3]

[2] This requires Levinson's I-inference heuristic to disambiguate referents and to supply bridging assumptions.
[3] Sometimes new nominal forms are coined to achieve cohesion through the headers.

Type 4/new or risky information type	(i) (ii) (iii) (iv)	Highly textual and highly crafted messages The messages are highly lexicalised. Pronoun use is minimal; instead the writer uses definite noun phrases, pronominals, nominals and nouns. With the exception of the M-inference GCIs are explicitly explained. The messages are characterised by expressions of tentativeness, especially modals of possibility and Q-clausal implicature of epistemic uncertainty.
Mixed type	(i)	Mixed messages contain any combination of two or more of the basic message types.

Table 5.3. Basic message types: Core features

The message structures of the default and the given information types are very similar. The distinguishing feature of the given information message type is the assumption of shared knowledge, marked by the heavy use of referential anaphora, elliptical expressions and high level of pronoun use. Messages of this type often rely on the reader making bridging assumptions to fill in the coherence of the topic and to identify referents. They frequently occur at the end of a string of messages to recap the discussion, technically called a "weaving message" (Feenburg 1989).

The risky information message type is most characterised by the care the writer takes in setting out his or her ideas and in the care taken to avoid ambiguity. This is the reason for the lexical density of this message type and the tendency to give an account of even the most standard GCIs; for example, making the temporal aspect of conjunctive "and" explicit by writing "and then". The structure of this message type is rigid. It is a strict pairing of [account+ formulation], with the alternative [account+ account+ formulation] occurring sometimes. This contrasts with the given information type structure, which consists of strings of accounts with an optional slot for formulation. The risky type of messages are therefore much more formal and closely follow the rhetorical structures for presenting academic arguments.

5.5.6.2 General discourse categories

Thirteen other discourse categories were derived from the intensive reading of the coded data. These categories are concerned with the use of indirect and direct expressions (and especially the use of CGI's), strategies used to maintain cohesion and coherence in the discussion and the uses of conversational strategies of repair. Tables 5.4 to 5.7 present the list of the thirteen general discourse categories, and a definition and example of the typical instantiations of each category.

Category	Definition	Examples from the data
7. Aizuchi	Content within messages that conveys presence or attention	R, I'm here and catching up. I have read all and will log on tomorrow.
8. False repair	Use of the conversational strategy of repair to achieve a different conversational aim.	It's been quiet. Maybe (tutor name) could explain the deadlines for us again.
9. Epistemic uncertainty	Use of Q-clausal implicature to emphasise lack of certainty or authority.	I believe it might help. I would think it is right.
10. Indirect command	Indirect speech act of command or strong request for action.	Perhaps, C would consider taking on the summary.
11. Indirect proposition	A proposition is expressed entirely though inference and implicature: GCI or PCI	I've finally finished the coursework for the issues module" ◄ PCI= I will now participate more actively.
12. M-inferences	Use of the GCI M-implicature to achieve stylistic markedness.	Prolixity Repetition Formal register

Table 5.4. Discourse management categories: Indirectness

Category	Definition	Examples from the data
13. Direct request for feedback	Use of a direct speech act to request feedback	What do you think? Can I have feedback please.
14. Direct command	Direct speech act of command addressed to group members. This category is only available to the co-ordinator and tutor.	Write up the summary now. Send me your questions.
15. Direct emotions	Use of a direct speech act to convey emotional or socially oriented content.	Congratulations. Thanks to you all. I am annoyed at your lack of co-operation.

Table 5.5. Discourse management categories: Directness

Category	Definition	Typical instantiation
16.Cohesion/echo	Cohesion is achieved by echoing a word, phrase or topic structure from a previous message.	Echo a header Echo a keyword Echo an in-joke Repeat a sentence or phrase from another message
17. Cohesion/ anaphora	Cohesion is achieved by use of anaphoric and elliptical expressions where the referent is in another message.	Coining keywords e.g. "the culture debate" Elliptical expressions e.g. "A's pp slides"

Table 5.6. Discourse management categories: Cohesion

Category	Definition	Examples from the data
18. Repair/self	Self correction	Me again. In my first message I intended to say.
19 Repair/other	Request for clarification, explanation or information	I don't know what you mean by… Do you need me to rewrite the question?

Table 5.7. Discourse management categories: Repair

Most of the discourse management categories can be explained through the definition and examples given in tables 5.4 to 5.7. However, a few of the categories rely on enrichment with context-specific information. Category 8, false repair, requires that the expression be read in context to reach a satisfactory interpretation. This involves reading the preceding messages and identifying the speech act performed, using the coherence principle[4] to include information on the reader's uptake. The following exchange from R5#1 to R5#3 illustrates the procedure.

Context: Student S was anxious that the summary would not be completed by the deadline. She submitted a string of messages commenting on the lack of activity in the group. In R5#1 she repeated the need to progress with the task and offered her own version of the summary as a prompt.

[4] The coherence principle is discussed with reference to the identification of speech acts in section 5.4.2

The false repair
R5#1: " I went through the responses once more for my own learning. Would you like me to me to share it with you?
What do we do next? I'm not sure what we should be doing? Can you help?
The uptake
R5#2: [co-ordinator] Thanks, I've been ill. I will draw up a schedule.
R5#3: [student J] I thought the summary was going to be a joint effort. Am I mistaken? Thanks anyway for all the hard work.

Equally, the expression of a proposition through implicature (category 11) can be achieved through the use of either a GCI, or PCI. The following extract from R2#5 illustrates how a proposition can be expressed through use of a GCI. The first GCI is a Q-scalar implicature, the second combines an M-implicature and a Q-scalar implicature. The GCIs are underlined in the text.

R2#5: I've been looking at R's web pages....There are <u>some</u> Word documents with <u>some</u> information.
I have also <u>managed</u> to look at an article by R. Can I assume he has not written anything substantial?
Reading
Implicature 1= some not all/not much
Implicature 2= Q inference: succeeded with effort.

Interpretation of a PCI by definition requires contextual information. The following extract from A3#30 is an example of one student reproaching another for lurking (reading but not participating in the group). The reproach is a PCI, which provides a reading of the optimum relevance of this comment.

Context: One group member contributed her first messages (A3#26 and 27) to the conference after a long period of lurking. The extract from the message below condemns lurking as a practice. However, there has been no previous mention of lurking in the conference. The relevance of the remark must therefore be to reprimand the new contributor.

A3#30: I do like the different terms that have developed over the last five years since I was involved in formal email communication. However I must say that the negative effects of such discourse we have witnessed in the business community with unidentifiable 'lurkers' having a very negative effect on fellow workers. I am interested to find out whether there is a similar effect in the schools and at tertiary level.

In the next extract from D2#11, the student co-ordinator teases the tutor about spelling errors. This extract is included in the example of the coding procedure in section 5.5.4. The pun is a PCI, expressing recognition that the tutor intends to demonstrate moderator techniques by example.

> **Context:** The tutor sometimes included deliberate spelling errors in her messages. Student M jokingly referred to this practice in D2#1. In D2#10 the tutor responds with a joke about sloppy editing. This extract, and the PCI arising, are the third in the adjacency set.
>
> **D2#11:** Many thanks, H. I shall order them immediately!
> 'Sloppy editing' is edifying, you know - despite what you say.
> Best wishes,
> N

5.5.7 Categories for a Conversational Approach to Learning

The second research aim is to conduct a mini-trial of the framework and the research methodology by using its data to examine a specific question. Broadly the question to be addressed is an examination of the idea that CSCL leads to deep-level engagement with the learning material. This belief is based dually on the claim that cooperative learning approaches lead to an improvement in learner motivation, and the claim that asynchronous online communications enhance opportunities for reflection. These claims have been reviewed in chapter 2.

With respect to this data sample, the task has been specifically designed (5.2.2) within the paradigm of Laurillard's (2002) model of learning.

The theoretical framework for the categories is also Laurillard's conversational approach to learning. A critical review of this theory is included in the literature review (section 2.3.2). In summary, Laurillard characterizes the process of deep-level learning as involving five interdependent mathemagenic activities: understanding the structure of the text, integrating different elements of the topic to a coherent picture, application of theory, and using conversational feedback and the feedback from applying theory to

practice to modify one's mental representation of the topic. In practical terms this involves making hypotheses, giving accounts of one's representation of the topic, engaging in critical dialogue with others and adapting one's understanding and formulations of the target learning material.

The categories for the analysis were derived by making an intensive reading of the coded data; with particular attention given to the speech acts and the propositional content of the messages, to identify behaviours and ideational content which instantiate Laurillard's mathemagenic activities. Marton and Saljo's description of deep and surface learning behaviours was used to supplement and inform the reading task. However, the theory was not operationalized to identify specific indicators for each of the mathemagenic activities. In this respect the methodology can only provide a general, surface analysis. Nevertheless, it was possible to identify six categories, which were considered to instantiate Laurillard's model. Table 5.8 presents an overview of the categories to precede the discussion.

Category	Definition
20. Lplatform	A platform message breaks down the task or the information content in a new way. It re-conceptualizes the way the task or topic is being viewed. It re-organizes the common knowledge base.
21. Lprobe1	A general prompt to reconsider and review the learning material e.g. "Have another go" "Look again".
22. Lprobe2	A request for repair or clarification with respect to the subject content.
23.Lprobe3	Specific feedback or critique on subject content.
24. Lprobe4	Direct challenge/expression of disagreement to another's representation of the learning material.
25. Lreflection	Meta-comment on the group process, reflection on the status quo and reflection on the process of co-operative learning.

Table 5.8 Categories for a conversational approach to learning.

The following paragraphs will explain each of the categories in turn.

A platform message (category twenty) conceptualizes the task or the learning material in a new way. It is quite different from a summary or weaving message that collates the

material contributed through a variety of different messages. The following extract from R3#15 is a typical example of a platform message. It is lengthy. It is a mixed message type, contributed by the co-ordinator, and includes elements of the two interactive message types and the given information message type.

The example message, R3#15, piggybacks on R3#12, where another group member collated all the interview questions that had been suggested by the R group. R3#15, the platform message, differs from R3#12 in that the writer reorganizes the material under broad headings, thus attempting an integration of parts, and also rewrites the interview questions.

> **R3#15**: Peace at last. I have looked at both your messages and thought I could perhaps mark them under the four headings below. Grouping the questions under these headings, we can see if there is a balance. Some of the questions can be reworded and amalgamated and I will try to do this. What is our focus going to be? What do we actually want to find out? Some of our questions are quite general but extremely interesting from a pedagogical viewpoint. I believe we should focus on an outcome before we start. Could we think about that tonight? What aspect do you want to know about? Here's mine.
> I am particularly interested to know -When does the tutor know that learning has actually taken place? If the course and task design are not good, does it follow that the student will learn. How slick should the course and task design be to achieve an outcome? Is progression important -should there be a smooth transition from task to task or is it possible to jump around from topic to topic and still have progression? Should we be looking at whether group size or mix is a key factor to learning? How does evaluation improve course and task design?
>
> Task design/Course design/Management of groups/General questions
>
> **Course design**
> What determines the content for an on-line course and what factors do you consider when designing tasks and learner assessment?
> How do you choose the most appropriate curriculum design model for a course?
> What do you consider to be the weaknesses of CMC course design?
> How do you keep yourself motivated to deliver the course?
>
> **Task design**
> How do you maintain the interest of your students?
> Given that the students all come from different backgrounds and education, how difficult is it to find ideas that challenge their learning?
> What indicators do you look for in order to determine whether to move on to the next area/topic/discussion?

What skills does the tutor need to create tasks that are clear to all members of the group?
When does the tutor know that learning has actually taken place?

Management of groups
Should the tutor or the students choose the groups they work in after getting to know each other and/or how are groups and group sizes determined?
How do you maintain the interest of your students and ensure that they all participate equally?
What management skills do you employ if you or your students have concerns?

General questions
Does the bonding between students affect the success of online seminars and what do you consider can be done to assist students to get to know each member of the course better?
What skills does a student need to use the system effectively and in what way will this new cyber culture impact the way we live our lives and the way we will learn?
What challenges and successes have you experienced with groups of learners consisting of a variety of ethnic backgrounds?

OK we now have 15 questions. Is that too many? Or is the balance right?

Learning probe1 (category twenty one) is the first in the "questioning behaviour" group. This category concerns messages that are directed towards a general encouragement to reviewing the learning material. The request is not targeted in its critique, but encourages others to question and to be critical. D2#8 is an example of this type of message.

Context: A number of formulations of question two had been presented but co-ordinator was not yet satisfied.

D2#8: QUESTION TWO
Let's keep thinking!

The second category in the "questioning behaviour" group, learning probe 2 (category twenty-two), is a request for repair. The writer typically explains the point of confusion and seeks clarification, requests additional information or further explanation. The category does not overlap with the general discourse category for repair (category nineteen), which is concerned with general conversational management. The learning probe 2 category is specifically targeted at requests for repair of understanding of the

learning material and the subject content of the interview responses. Care was taken in compiling the database to implement this distinction. An example (from H3#13) is provided below.

> **Context**: This is a response from student Y to student I. This extract is an example of a request for clarification of the subject content.
>
> **H3#13**:
> Are courses adapted from campus-based ones or are they specifically designed as computer-based courses?
> **Do you mean that whether CMC is just substitution of /or conversion of the campus-based course or the CMC is newly designed?**
>
> How are courses structured (loosely early on, more structured later, vice versa, or an equal degree of structure throughout)?
> **It sounds like:**
> **1. the basic concepts of CMC course design; and**
> **2. the developing priority related to developing period.**
> **Thus, it can be said developing schedule. Is that right?**

Lprobe 3 (category twenty-three) concerns questioning behaviour that offers feedback or critique on a specific topic. The feedback is targeted and a rationale is given for modifications suggested. Typically, the feedback is offered as a suggestion or recommendation, which the recipient of the feedback may choose to reject. An example of this type of feedback is an extract from D2#5.

> **D2#5**: After thinking about the first of your questions P (more time, polish linguistic output before delivery etc) ..... I wonder whether it wouldn't be better to open it up a bit. Mason (did you manage to access this paper?) identifies what he terms' backbone elements' to online courses - asynchronous communication, real-time interaction and access to materials. I was thinking that perhaps we could ask - What criteria do you use as a course designer in deciding on the balance of these three elements? In this way we are setting your thoughts on asynchronous communication in a more general context but I feel we might glean additional material in her answer that we are not aware of. If, however, the broadening of the question produced an answer that you felt missed the point then we are able to go back once for clarification anyway.

Lprobe 4 (category twenty-four) is the fourth category in the "questioning behaviour" group types and covers responses that offer a direct challenge to another person's conceptualization of the subject content. These comments usually include an elaborated

argument to express strong disagreement with the intended reader. They are typically written in the structure and mode of the risky message type. Unlike comments in the third, specific feedback category, the message is not presented as a recommendation, but as a position statement. Message D3#19 is an example of this category from the data.

Context: D3#19 is the response to D3#16, which offered feedback on the writer's formulation of a question on cultural diversity. The writer rejects the feedback and challenges the assumptions being made and her colleague's understanding of the topic of cultural diversity.

D3#19: I read M's points about diversity. She was concerned about diversity of ages, gender, countries, cultures, professions and personal experiences from around the world. To frame a question that incorporated so many kinds of diversity seems too broad, and, in a sense, the interaction of the students would reflect their diverse experiences and hopefully enrich the course. I was concerned about the fact that a linguistics course is developed by British writers and I wondered how much exposure these writers had to the various cultural influences that affect the use of the language.
In Jamaica, for example, the teaching of English has been greatly affected by the sentence structure and vocabulary of certain African languages that the slaves brought with them from Africa. In other West Indian countries such as Dominica and St. Lucia, the presence of a French based creole has had an impact on the teaching (and learning) of English. How knowledgeable are the writers of the course about the many cultural and linguistic influences that have had an impact on the teaching of the language? Remember, one of the aims of the course is to "deal with the global issues that all countries face because of today's widespread local and international use of English". Additionally, the course is aimed at teachers of English.

You may indeed want to open up the question of diversity but I was particularly concerned about the writers' appreciation of cultural diversity in the design of the course and its content.
W

The last of the learning analysis categories, Lreflection (category twenty-five) records instances of meta-comment on the task and group process, which is regarded as an aid to learning. One type of meta-comment is reflection on the demands of the task, as illustrated by the following extract (A1+2#9):

A1+2#9: R, as you point out this is difficult not knowing who we are "speaking to", /but here goes . It is based on the info about (our interviewee) that you drew attention to. Also it is difficult to know how detailed an e-mail question should be.

A second type of meta-comment in this category are comments which give an account of the status quo, with respect to the group's progress in completing the information requirements of the task or with respect to their progress in working co-operatively. Status quo messages, which are usually contributed by the co-ordinators, are to do with process management. These messages contain an assessment of the group's position with respect to the target goal. They often occur around the mid-point of the sub-task of formulating interview questions and are aimed at leading the group to successful completion of the task. For example, accounts of the information status typically consist of a summary of agreed points and a list of outstanding sub-tasks, with requests or commands to individuals to act on them. Accounts of the status quo of group process are more unusual, and may occur in this form only if the group is seen as not working co-operatively. An example of this type of comment (H3#23) is given below.

Context: The message was submitted by the co-ordinator at the mid-point of the task of formulating questions.
H3#23: In terms of the way that we are working, I feel that 'discussion' has been sparse and that several of my questions etc about the draft questions haven't got a reply – I and Y- you seem to have started up a proper discussion at this late stage but along a different thread from where B and I had got to mid-weekend!
So please could I have some clarification, using the draft questions in my message 'selecting 5 questions' -if you want to replace one of the 6 with something totally different please post the exact wording so that it is ready to send. I'd also be interested to know what you all think about our group process and how we might have engaged in more effective discussion earlier....

The third type of meta-comment in this category is reflection on the ways in which working in a cooperative group has or has not enhanced personal learning. Comments of this type tend to occur during the closure of the conference or immediately after the interview questions have been posted and a reply is awaited. D4#2 is an example.

D4#2: Looking back over our brief collaboration together so far I realize firstly how the small number of participants facilitates discussion.
I also realize the way I - as an individual - have managed to inch forward in constructing my ideas - through debate with you, the team.
Thirdly, I see again - as I do in the exchanges with the adult students on my DE course here - the importance of what I might call the transactional language we have used in our debate with an aim to reaching consensus. I immensely appreciate the tone of our discussion. I've mentioned 'empathy' elsewhere in this conference, and it is a concept I feel very strongly about. Don't know where I'm going with this idea, but working with you both, and communicating with all the other people in this conference, is proving an invaluable source of inspiration.

5.5.8. Creating a Database

The twenty-five categories identified from the reading of the coded data were entered into an Excel spreadsheet to create a database.

Approximately twelve weeks after the categories were first collated, the coded data was read again and entered into the categories in the spreadsheet. The method of entering the data was to mark the occurrence of the category as present or absent for each of the 334 messages. The database does not record the number of occurrences of any of the categories within a message.

The sum of each category was totalled and the percentages were calculated for three different types of reading:

- The prevalence of the category, expressed as a percentage of all the messages (334) in the corpus.
- The percentage of messages within each message type in each of the discourse and learning categories.
- A reading for each category of the percentage of occurrences, broken down by message type e.g. 20 % of the aizuchi category are conveyed through the default message type.

The purpose of creating a database was to provide a check on the validity of the categories; i.e. empty or near empty categories are not valid categories. Further, the

procedure of entering the data into the categories tested the definition of each category. This indicated where a definition needed to be modified to narrow down the selection criteria of the category. Calculating the percentages makes an additional check on the validity of the categories and also reveals patterns in the way the categories are used.

5.6 RESULTS OF THE ANALYSIS

The database of results indicating the distribution of each of the thirteen general discourse analysis categories and the six learning analysis categories across the six coding categories for message types is in Appendix III.

A graphic representation of the same information is also presented in Appendix III.

5.6.1. Message Types: Validity

The 334 messages were distributed without difficulty across the six categories for the message types, using the descriptors of the structure and core features of each type as set out in tables 5.2 and 5.3 in sections 5.5.4.1 and 5.5.4.2. The messages were attributed to a message type where the structure and core features of a type are prominently used. Allowance is made for variance in the addition of a conversational move, or a sequence of moves, which does not strictly conform to the patterns and structure of the message type. Table 5.9 shows the distribution of the messages across the categories by rank order, by percentage, and by number.

Rank order	Percentage	Number
Interactive-directive	24%	79
Default	23%	76
Interactive-social	19%	62
Given information	18%	60
Mixed message type	12%	39
Risky	5%	18

Table 5.9: Distribution of the messages by message type

If the two interactive categories are combined, on the grounds they differ only in speaker aim, in this data 43 % of all the messages exchanged are the interactive type.

As the occurrence of risky type messages was considerably lower than the other message types, a check was made on the profile the analysis describes for risky messages. Examining which discourse and learning categories are present in the message type and the extent to which they are present did this. Establishing the profile gives an indication of the uses of the message type. In this data set, marked sets of readings for this message type are clustered in the learning analysis categories. The readings are marked because the percentage of messages, which include an instance of each of the learning categories, is consistently higher than the average. In contrast the percentages of messages which include instances of the discourse categories are always either average or below average. Furthermore, although there are relatively few risky type messages in the data, the breakdown of the occurrences of the category by message type, shows that risky type messages are used when the talk is focused on the learning content. Table 5.10. summarizes the usage profile of the risky type messages within the learning analysis categories.

Learning analysis category	**Presence in Risky Messages**	**Average % Presence -all message types**	**% occurrences through use of risky type message**
Platform	44%	20%	15%
Learning Probe 1	28%	21%	8%
Learning Probe 2[5]	6%	8%	4%
Learning probe 3	28%	19%	8%
Learning probe 4	22%	6%	31%
Reflection	39%	20%	13%

Table 5.10. Usage profile for the risky message type: Learning analysis categories

[5] Learning probe 2 is seeking repair or clarification. As there are relatively few occurrences of repair within the data, this probably accounts for the relatively low readings, including the sub-average reading, of risky message types on this category.

The conclusion is that the risky message type is a valid category for this data. The relatively low number of occurrences may be attributable to the design of the task that promoted attention to group management and to a conversational style of dialogue.

Result 1: All the message types are considered valid categories for this data.
Result 2: The structural composition and core features identified for each message type are consistent with the data.

5.6.2. Default Message Type: Profile

There are no clearly marked characteristics for the default messages type across the discourse categories. Instead, the default type messages show below average percentages for presence of many of these categories.

In terms of discourse usage 30 % of default type messages include an indirect command. However, the average for this category is 42 %. Similarly, 14 % of default messages include a direct command compared to an average of 19 %.

The default type includes a social tone. However, it is underplayed and may simply be the baseline of acceptable social behaviour for these groups. 17 % (2 % below average) of the default type messages contain aizuchi. 24 % of the messages contain expressions of direct emotion, whereas 34 % is the average for this category.

Few messages of this type contain expressions of indirect meaning: 3 % contain expressions of epistemic uncertainty, 8 % contain an indirect proposition, 9 % display use of Levinson's GCI M-inference. The percentage is well below the average in all these categories and the default message type is often ranked lowest for inclusion of the GCI.

The default message types also ranks lowest in regard to linkage and reference to other messages. Only 9 % include expressions of cohesive echo (average 23 %), 21 % contain expressions anaphoric reference (average 43 %). This result is marked, as the cohesion categories are significantly present across all the messages types. Further, the default

message types contain relatively few direct requests for feedback: 12 %, which make up only 9 % of all the occurrences of this category in the data.

Nevertheless, 23 % of all the messages contributed to the conferences are messages of the default type. This places the default message type in second rank for frequency (table 5.9) behind the interactive types, if combined, and ahead of the interactive-social type (19 %), if the interactive categories are kept separate.

So, what kinds of speech act are messages of the default type being used to convey? 18 % of all indirect commands and 16 % of direct commands are conveyed through this type. It is also used to convey 20 % of all occurrences of aizuchi, and 16 % of all expressions of direct emotion.

The default message types also displays prevalence in the learning platform category. 32 % of all default message types are platform messages, and they make up 44 % of all the learning platform messages.

However, there are no other marked patterns for the default message type across the learning categories. With respect to the group of four "questioning behaviour" categories, the default type is little used for learning probe 2 (repair) or 4 (challenge). 20 % of this message type display learning probe 1 features (general prompt) and 17 % display learning probe 3 features (specific feedback), and this message type tends to be used for this purpose more or less equally with the mixed and interactive-directive message types.

Result 3: The default type messages are prevalent in the data, yet the type lacks marked discourse characteristics. It is a neutral vehicle for conveying a variety of different kinds of information, and is often used in stand-alone mode.

Hypothesis 1: The hypothesis arises that this message type is used as a means to avoid the direct expression of meaning, which is automatically carried by the other message types.

5.6.3. Interactive Message Types: Profile

The structure of the two interactive message types is identical. They are distinguished by the speaker's aim in the message and therefore by the communicative acts they are used to convey. The analysis fully supports this distinction. The analysis shows predictable similarities in the composition of the messages and some marked differences in usage.

Both the social and directive interactive message types make implicit reference to other messages in the discussion. 54 % of all the interactive-directive messages and 37 % of the interactive-social messages contain anaphoric references. Cohesive echo is used as a strategy for cross-referencing in 22 % of the directive messages and 24 % of the social messages.

There are also relatively similar levels in the use of indirect expressions of meaning. 16 % of both message types contain indirect propositions, which are inferences interpreted through the GCI or PCI procedures.

With respect to other forms of indirectness, it is noticeable that the interactive-directive messages contain slightly higher levels than the social messages. 10 % of directive messages include expressions of epistemic uncertainty, compared to 6 % of social messages. Further, 23 % of directives make use of M-inferences as a stylistic feature as compared to 6 % of social messages. Moreover, this difference is predicted and consistent with the difference in speaker aim. The directive messages are aimed at stimulating action or reflection in others. As a consequence, the higher levels of indirectness, indicating more careful crafting of the text (M-inferences.) and the denial of certainty, are to be expected as a form of politeness.

The social /directive distinction is fully borne out by the profiles of the messages with respect to the types of action they typically are used to perform. The interactive-social type is used for socializing and expressing emotions: 58 % of this type of message contain expressions of direct emotion, 35 % include expressions in the aizuchi category, 27 % express indirect commands. Moreover, 32 % of all expressions of direct emotion,

35 % of all occurrences aizuchi and 25 % of all self-repairs are conveyed using the interactive-social message type.

In contrast, the predominant uses of the interactive-directive messages are to express indirect commands (48 % of all directive messages), to make direct requests for feedback (47 %), to express direct emotions (30 %) and for the tutor or peer co-ordinator to give direct commands or instructions (30 %). In terms of the percentage of the overall occurrences of these categories, 42 % of all direct commands, 37 % of all requests for feedback and 29 % of all indirect commands are conveyed through the interactive-directive message type.

There is also a marked difference between the two types with respect to seeking or offering repair. There is a clear correlation between the interactive-directive type and repair as a discourse strategy. As repair is not a widely used strategy in the data, the percentage of directives, which contain this category, is relatively low: 22 % other-directed repair, 5 % self- repair, and 4 % false repair. However, the interactive-directive type is the message type most commonly used to convey a repair in the discourse. Of all the occurrences of repair in the data, the interactive-directives account for 52 % of requests for repair, 43 % of false repairs, 25 % of self-repairs and 23 % of learning probe 2 (subject content) repairs.

This can be compared to the results for the interactive-social message type, which shows, with the exception of self-repair, a zero result on all the repair categories.

There is a similarly marked difference between the two interactive messages types in their distribution in the learning analysis categories. Table 5.11 shows the percentage of interactive messages, which contain occurrences of the learning categories, and compares this to the average for each category.

Learning analysis category	Presence in Interactive-social Messages	Presence in Interactive Directive Messages	Average % Presence -all message types
Platform	2%	3%	22%
Learning Probe 1	3%	19%	21%
Learning Probe 2	0%	5%	8%
Learning probe 3	8%	18%	19%
Learning probe 4	0%	3%	6%
Reflection	5%	14%	20%

Table 5.11. Usage figures for the Interactive message types in the learning analysis categories

These percentages clearly indicate that the interactive-social type occurs very little when the subject content is the focus of the talk. On the other hand, the percentages for the interactive-directive types are more or less average for the learning activities. As might be expected the directives are most used to stimulate reflection (Lp1), to give feedback (Lp3) and to request repair (Lp2). 23 % of all Lp2 repairs are done through the directives.

Result 4: The distinction made between the interactive-social and interactive-directive messages types is supported. These message types share a common message structure and style of composition, but differ markedly in the types of speech act they are typically used to convey.

Result 5: There is a correlation between the interactive-directive message type and the conversational strategy of repair. On the other hand the interactive-social type is rarely used to give or seek repair.

Result 6: Despite comprising 19 % of the data, the interactive-social message types are not widely used for discussing the subject content. In contrast, the interactive-directive type does occur during the subject-based discussions, and is especially used to give feedback or make a commentary.

5.6.4. Given Message Type: Profile

The structure of the given message type is very similar to the structure of the default message type. The primary distinguishing characteristic of the given message type, is the textual expression of presumptions of shared knowledge; i.e. the assumption that certain information is so well known to all parties that to make it explicit would breach the Co-operative Principle (Grice 1967, 1975). The analysis fully supports this reading of the data.

Firstly, a significant percentage (65 %) of the given message type make use of anaphoric referential links to other messages. Rates of use of cohesive echo are also high and 32 % of the given message type include these types of links. Furthermore, 27 % of all occurrences of the anaphora category and 25 % of all occurrences of the cohesive echo category are carried by the given message type, although these two categories are present to high levels in all message types.

When compared to the default message type there are marked differences between their profiles on the two discourse cohesion categories. 65 % of the given message type contain anaphoric reference, whereas only 21 % of default messages display this feature. Further, 32 % of given type messages include echoed expressions compared to 9 % of default message types.

The given message type are also distinguished by relatively high levels of indirect meaning. Table 5.12 shows the percentage of given messages, which contain occurrences of the three categories of indirect meaning, and compares these to the percentages for the default message type and to the average for each category.

	Given Messages	Default Messages	Average
Epistemic uncertainty	23%	3%	12%
Indefinite proposition	28%	8%	18%
M-inference	20%	9%	19%

Table 5.12. Percentages for indirect meaning in the given message type

As the figures in table 5.12 clearly show, the given message type relies quite heavily on use of indirect forms of expression. Moreover, the high percentage of use of indefinite propositions is outstanding, and far beyond the percentages for other message types. On the other hand, the high levels of epistemic uncertainty are rather unexpected and would need to be examined further.

Like the default type, the given message type appears to have no particular role or character with respect to managing the general discourse. The percentages in each of the general discourse action categories (repair, indirect and direct commands, request for feedback and expression of direct emotion) are consistently average or below average for each category.

On the other hand, there is a clear pattern in the use of the given message types to ask questions about the learning material. This message type is consistently and heavily used within the group of four questioning categories in the learning analysis section. 20 % of all given messages include an occurrence of Lp1 (encouragement to reflect), and these messages account for 19 % of all occurrences of the category. Significantly, the percentage of messages that include Lp2 (learning repair) and Lp3 (focused feedback) is even higher. The 15 % of given messages in the Lp2 category achieve 36 % of the occurrences, while the 30 % of given messages in the Lp3 category achieve 30 % of the occurrences. Only 5 % of given messages are used for Lp4 (direct challenge). However, due to the low number of messages in this category this represents 23 % of occurrences.

Perhaps surprisingly, the given message type is relatively little used to convey platform messages. 17 % of given messages are classified as platform messages. However, this represents only 19 % of all the platform messages in the data. In contrast, 44 % of all platforms are conveyed through the default message type.

Result 7: The given message type is characterized by high levels of inter-message referencing, anaphoric reference and indirect expressions of meaning. Therefore these

messages are uttered with the presumption of a certain amount of shared (given) knowledge between the people in the conversation.

Result 8: The percentage of given messages, which include expressions of epistemic uncertainty is unexpectedly high.

Result 9: The most marked use of the given message type is to ask questions or to present critical feedback in discussions of the learning material.

5.6.5. Risky Message Type: Profile

The risky type message is a carefully composed text. The writer sets out ideas that are new in some way. The messages of this type were observed to be highly lexical and to contain very few uses of GCI. The analysis supports this description.

The messages are textual. 22 % contain M-inferences. This is a consistent level for the more crafted messages. Moreover, messages of this type contain relatively few anaphoric references to other messages or even within the message. Only 28 % of risky messages contain anaphoric reference, far below the average of 42 % for this category and well below the levels shown by the given and mixed message types. In contrast, the message type shows high levels of usage of the cohesive echo category as a discourse strategy. 44% of risky messages include echoed expressions, against an average for this category of 26 %.

The content is rarely expressed through inference. 11 % of the risky messages contain expressions of indirect meaning. The average for this category is 18 % and the given message type, which is the other major textual type, scores 28 % on this category. Further, the risky message type has a high reading on expressions of epistemic uncertainty: 28 % compared to an average of 12 %.

With respect to the communicative acts typically performed by this message type, as already established in 5.6.1, the risky messages in this data are most used to discuss the learning material. Table 5.10 summarizes the data for this result (section 5.6.1). A notable pattern is that despite making up only 5 % of the data, the risky type messages are quite

extensively used to write platform messages (15 % of all occurrences), to challenge another writer's ideas (31 % of occurrences) and for meta-comment (13 % of occurrences). As might be predicted, although a good proportion of risky messages include feedback and questions on the learning material (28 % in both Lp1 and Lp3), these communicative acts are mainly performed using other message types.

Finally, the risky type messages are never used for conversational repair or to express a direct command.

Result 10: The risky type is a highly textual, highly lexical message style. The high levels of epistemic uncertainty expressed show that the writer is expressing new ideas, or ideas which are not guaranteed to be accepted.

Result 11: The risky type of message is most prevalent in the discussion of learning content. It tends to be used for the exposition of ideas.

Result 12: Direct repetition of expressions and phrases from other messages is extensively used in messages of this type as a strategy to maintain conversational cohesion.

5.6.6. Mixed Message Type: Profile

The mixed message type is a catch-all category for messages, which include more than one of the five[6] main message types. There is no particular configuration for which types might be used together within the boundaries of a single message. As a result, only quite general patterns of usage can be defined for this type.

However, the mixed type corresponds to a widely observed phenomenon in online discussion groups where the interlocutor performs multiple communicative acts within the same message boundary. Co-ordinators and tutors often present long messages, addressing for example both the management of the group discussion and the conceptual understanding of the subject matter. Mixed message make up 12 % of the data, and there

[6] The five main types are the 4 basic types, including the division of the interactive type into two sub-types.

are certain definite results with regard to the discourse categories, which would suggest the mixed message type is used purposefully.

Mixed messages do indeed appear to be oriented more towards the management of the group than the discussion of ideas. Firstly, this type is closely correlated with indirect and direct commands. 62 % of mixed messages contain an indirect command and 44 % contain direct commands. These figures indicate that mixed messages convey 19 % of all indirect and 25 % of all direct commands. As direct commands are only available to the co-ordinators in this analysis, this supports the view that this messages type is mainly used for group management.

Secondly, this type is notably more interaction oriented than information-carrying. Mixed messages are marked by very low rates of epistemic uncertainty. 5% of mixed messages contain expressions of uncertainty as compared to the average of 12 % and the higher rates of 28 % and 23 % for the learning-content rich risky and given message types. On the other hand, mixed messages very frequently include direct requests for feedback (51 %) and quite frequently contain direct speech acts expressing emotions (46 %).

Thirdly, mixed messages are also used for conversational repair. This message type is used to convey 29 % of false repairs, 21 % of repairs directed to other people, 20 % of requests for repair on subject content, and 13 % of self-repairs. The distribution of this type in the learning analysis categories peaks in Lp1 (general prompt) (38 %) and in the meta-comment category (33 %).

The existence of the mixed message type as a coding category does not challenge the message (or the five main message types) as a unit of analysis, since the individual message types are clearly identifiable within the boundaries of the mixed type. Mixed messages are a chaining together of what would otherwise be treated as separate messages. The type therefore is a form of marked behaviour.

Result 13: Mixed messages are a significant part of the data and seem to be used purposefully. However, more analysis of this category is needed to arrive at a description of the combination of types and to examine whether certain combinations are used for specific discourse purposes.

Result 14: Mixed messages tend to be used mainly for messages concerned with group management.

5.6.7. Directness and Indirectness

In this research study directness is synonymous with use of a direct speech act. The initial analysis identified three categories for direct speech acts: direct requests for feedback, direct expressions of emotions and direct commands. To ensure that the felicity conditions for a command are fairly met, the last category is available only to messages written by the tutor or the student co-ordinator.

Indirectness involves the reader in determining the speaker's intention and the meaning through inference. Further, indirectness may involve speech or actions. Indirectness through speech involves use of indirect speech acts, or implicature achieved through use of a GCI or PCI. Indirectness through action can involve using one type of conversational move to achieve an aim typically associated with a different type of move e.g. use of a false repair to stimulate participation. Indirectness through action can also be achieved through choice of message structure, and use of the functionally neutral default message type in particular.

This CSCL task involves writing two joint papers, and thus, the students' focus is on coordinating their actions. And, indeed, the analysis shows participants used quite a large number of direct and indirect speech acts to influence each other's actions. Table 5.13 shows the percentages (and numbers in brackets) of the 334 messages in the database for the three direct speech act categories and the five indirectness categories.

Indirectness categories	**% of corpus**	**Directness categories**	**% of corpus**
False repair	2% (7)		
Epistemic uncertainty	10% (32)	Request for feedback	30% (100)
Indirect command	39% (129)	Command	20% (67)
Indirect proposition	17% (58)	Expression of emotions	34% (114)
Use of M-inferences	18% (59)		

Table 5.13: Percentages for discourse categories of directness and indirectness

The direct speech acts are all targeted towards group management and the completion of the task, and are therefore serving quite a specific function in the online discussions. Furthermore, as established in the discussion of results in 5.6.3, there is a very clear correlation between the three direct speech act categories and the interactive-directive message type. Directness was used in this task to ensure things get done.

There is also a large quantity of indirect commands, which suggests tentativeness in requiring others to do things. However, the category is very broad. It is used as a global cache for all indirect speech acts of command, advice, warning, suggestion and strong request made with regard to the management of the task or the discourse. It therefore spans too great a range of illocutionary acts to provide a clear picture.

Overall, the percentages for the indirectness categories are lower than might be expected. This suggests that participants on this task were quite explicit in setting out their ideas. However, use of indirect expressions of meaning are quite thinly scattered across most of the messages in the database and across all messages types. There are no very obvious peaks of correlation between message type and discourse category as is the case with the three discourse categories for direct speech acts.

The only clear correlation between message type and the discourse categories for indirectness is the correlation of the given message type with the three GCI categories

(Table 5.12 in section 5.6.4). The more content-rich and textual message types, the given and risky types, sometimes include expressions of epistemic uncertainty.

20 % of given and 22 % of risky messages include M-inferences, which is only moderate use. However, 23 % of the interactive-directive message type contains M-inferences, and the mixed type also significantly exceeds other message type categories in the use of M-inferences. This may indicate that M-inferences are associated with the extent to which a message is crafted.

Result 15: In this data direct speech acts are frequently used to organize the group task. However, direct expressions tend to be restricted to this activity.

Result 16: The indirect command category should be sub-divided to provide a more fine-grained information base on the speech acts performed.

Hypothesis 2: M-inferences occur in messages, which are crafted.

5.6.8 Patterns of Cohesion and Coherence

The research methodology provides quantifiable information on three strategies for textual and conversational cohesion and coherence. The results of the analysis indicate that all three occur quite extensively in this data.

The most common type of all is the use of adjacency pairs to structure the conversation. For instance, together, the interactive message types, which consist almost entirely of a structure made up of strings of adjacency pairs, make up 43 % of all messages in the corpus. The default and given message types, both of which include at least one adjacency pair, make up 23 % and 18 % of the corpus (Table 5.9 in section 5.6.1). This result is consistent with the theory of Conversation Analysis, which includes the finding that the adjacency pair structure is frequently the backbone of conversational management.

A second prevalent pattern of textual cohesion is the use of referential anaphora. All message types contain quite high levels of anaphoric reference, which according to the definition used for this category are disambiguated through the GCI I-principle. As predicted by the definitions and descriptions of the message types (Tables 5.2 and 5.3), the given message type contains the highest levels of anaphoric reference: 65 % of all given messages. The interactive-directive message type also shows high levels of this reference mode. 54 % of all interactive-directive messages contain anaphora, which is equivalent to 30 % of all occurrences. In contrast, only 21 % of the default message type contains anaphoric reference. The default type ranks lowest on this category, and unexpectedly tends to include fewer references than the highly nominalized, risky message type (section 5.6.5). This finding was reported in section 5.6.2, and found to indicate that the default type is often used as a stand-alone conduit for information.

The third type of cohesion coded by the framework is the "cohesive echo". This refers to reiteration (Halliday and Hasan 1976:281-284). Lexical cohesion through reiteration can be direct repetition or use of a synonym, super-ordinate, or general word. Presence of this category is distributed fairly evenly and to a moderate extent across most messages types; for almost all types approximately 20 % use this cohesive technique. However, the exceptionally high percentage (44 %) of risky type messages displaying this feature is a marked pattern. Observation suggests that in risky messages the repetition often occurs in the subject header. On the other hand, the default type messages rarely (9 %) make use of repetition for cohesion.

Online discussions using the First Class software are also structured through message threading. This is an important strategy for preserving conversational coherence online. This research study has not included the data on message threading.

Result 17: Adjacency pairs are extensively used to structure the online discussions.

Result 18: There is a marked tendency for writers to use repetition (cohesive echo) to link risky type messages to other messages in the discussion.

Repeated results: result 3 and result 7.

5.6.9. Use of conversational strategies of repair

The research framework reports on two kinds of conversational repair strategy: self-repair (category 18) and requests for clarification or repair of the discourse directed towards other group members. There are three types of other-directed repair: requests for repair which concern the group's work on the task (category 19), repair which is concerned with the learning material (category 22) and false repair (category 8).

The percentages of occurrences of the four categories indicate that conversational repair is probably a required aspect of the discourse. At first sight the percentages of occurrences per category appear low: false repair makes up 2 % of the corpus, self-repair is 5 % of the corpus, learning material repair is 7 % and other-directed repair is 10 %. However, if taken together and cumulated, this is not an insignificant proportion of the data. Moreover, in this data there are distinctive patterns in the way the different types of repair strategy are used.

Firstly, self-repair appears to have a social function. 25 % of all occurrences of self-repair are delivered using the interactive-social message type. This compares markedly to zero realisation of this message type for all the other types of repair.

Secondly, general requests for repair, which are the most common repair strategy in this data, are frequently conveyed through the interactive-directive message type. 22 % of messages of this type include general requests for repair. This represents 51 % of all occurrences of the "other-repair category".

Thirdly, this result contrasts with the prevalence of the given message type for conveying repairs and requests for clarification which are to do with the learning material. 15 % of given type messages contain this type of repair, which represents 36 % of occurrences in this category. Subject content repair is also noted in the default (24 % of occurrences) and mixed message types (20 % of occurrences).

Fourthly, just as for general requests for repair, there is a clear association between the false repairs and the interactive-directive message type. Although the overall number of false repairs in this data is small, 43 % are conveyed through the interactive-directive messages. Further, there is similarity between the distribution patterns of general repair requests and false repairs across the message types.

	General repair	False repair
Default	15%	14%
Interactive-social	0%	0%
Interactive-directive	51%	43%
Given	12%	14%
Risky	0%	0%
Mixed	21%	29%

Table 5.14. Distribution patterns for general repair and false repair

These results for the false repair category suggest that false repairs may be a sub-type of the general repair category.

Result 19: Sociability is one notable use of the strategy of self-repair.

Result 20: General requests for repair are concerned with getting something done, whereas learning probe repairs often rely on re-activating shared subject knowledge.

Hypothesis 3: False repair is a sub-type of general requests for repair.

5.6.10 Learning analysis categories

The purpose of considering some aspects of learning behaviour is to further test the framework by using its output as data for a theory-driven question. The question being addressed is whether the participants in this study engage in mathemagenic learning activities, advocated by Laurillard's conversational model of learning.

Taking an average of the percentages of the learning categories indicates that approximately 14 % of the corpus includes instances of the learning categories. The rates of activity, measured as a percentage of the corpus, within the six categories are fairly

even, with predictable dips on the learning repair and direct challenge categories (Table 5.15).

Platform messages	16%
Lprobe 1 (general stimulus)	19%
Lprobe 2 (repair)	7%
Lprobe 3 (focused feedback)	18%
Lprobe 4 (direct challenge)	4%
Meta-comment	16%

Table 5.15: Rates of activity: Learning analysis categories

The distribution patterns in the full database show that platform messages tend to occur within the first twenty messages of each group discussion. A fairly typical development for the learning categories from this starting point might be a sequence like:

(i) platform + meta-comment

(ii) a period of questioning

(iii) meta-comment + Lp1 stimulus questions

(iv) a sequence of a platform message, followed immediately by questions and then by meta-comment

Reading the transcripts revealed that some groups were more successful than others in the learning task. However, the quantifiable measures used for this analysis are not designed to code this information.

The analysis does reveal clear associations between the learning categories and particular message types. The most prominent is the association between platform messages and the default message type. 44 % of platform messages are conveyed within the default message type. This contrasts sharply with the distribution rates for the given, mixed and risky message types for platform messages.

Lp1 and Lp3, which are the two questioning categories with relatively high frequency rates, are conveyed more or less equally between the default and interactive-directive message types, on a range of 20-23 % of occurrences.

Lp2, the repair category, is most closely associated with the given message type (as discussed in 5.6.9). Lp4, the direct challenge, is conveyed, as expected, first and foremost by the risky message type (31 % of occurrences) and moderately by the given message type (23 % of occurrences).

There are no specific patterns available for the association of the meta-comment category with any particular message type. The distribution of occurrences is fairly scattered. Overall, the interactive-directive, given and mixed message types are most used to deliver this content. The default and risky message types are used sometimes; 15 % of occurrences are in default messages and 13 % in risky messages.

Possibly, one of the most marked results is the prevalence of the default message type across all the learning categories. It is possible that this result may support Hypothesis 1; that this message type is used to express the neutrality of the underlying communicative act. Further research is needed to examine the hypothesis and possible links to the other analytic categories.

Result 21: Approximately 14 % of messages in the corpus include instances of the learning categories, with the platform messages, and general stimulus and feedback questions all equally evenly distributed.

Result 22: It is possible to map out a typical development of the subject-content discussions by plotting the distribution of the occurrences of learning categories in the full database. A preliminary attempt was made in this study.

Result 23: There is a clear association of certain learning categories with specific message types.

5.7. SUMMARY

The chapter describes and explains through examples the research methodology. The methodology consists of four main phases: (i) coding of the data using the analytic framework developed in chapter 4, (ii) intensive reading of the coded data to derive

categories for the analysis, (iii) analysing the messages according to the nineteen categories identified (iv) creating a database of results to provide a check on the analysis and to undertake a simple quantitative analysis. The output of the analytic framework was also checked against an independent, theory-derived set of categories.

The results of the research show that there are six distinctive types of message structure, each of which conveys a basic communicative function. The content, forms of expression and persuasive functions of the messages in this data are overlaid on to one of these basic message types.

The participants in this study used a relatively high number of direct expressions. However, directness was used with respect to group process and particularly to command, praise, confirm and endorse etc. Indirectness tended to occur where the subject content was discussed.

In this data there are also patterns in the use of cohesion and coherence and repair as discourse management strategies. Cohesion is achieved through the prevalence of adjacency pairs, use of anaphoric references and reiteration. Conversational repair was observed to have a variety of functions in addition to seeking correction of understandings. These include the social function of self-repair, the task management function of false repair and the assumption of a shared approach to certain concepts, which characterises the learning feedback repairs.

The results from the analysis of the learning categories are less well clarified. This part of the analysis was a mini-test of the analytic framework, and the results are a preliminary reading. However, it is clear that in these discussion groups, which were deliberately set up to do tasks designed within the paradigm of Laurillard's conversational framework, there is some engagement in a cycle of setting out a representation of the topic or of an idea and critical questions and feedback on this representation.

5.8. CONCLUSION

The research methodology gave rise to number of clearly defined results, particularly in the discourse analysis and discourse management categories. The main basis of the research methodology is the analytic framework, developed in chapter 4. The consistency and clarity of some of the patterns observed in the results are taken as evidence that the framework is an effective instrument to conduct a data-driven discourse analysis.

The next chapter conducts a review of the research methodology and the results.

CHAPTER 6: DISCUSSION OF RESULTS AND METHODOLOGY

6.1. INTRODUCTION

The aims of this chapter are:

(i) To discuss and interpret the results of the analysis reported in chapter 5.

(ii) To evaluate the research methodology.

Two claims are made for this research. The first claim is that it has been possible to design and apply an analytic framework, which can be used for the analysis of CMC discourse, that is based in established pragmatic theories and does not require contextual information external to that provided by the analytic framework to arrive at a motivated interpretation of speaker meaning. The second claim is that the evidence for the existence of the four distinct types of prototypical message schema within this data is sufficiently compelling to generate the hypothesis that these prototypical schemas are a feature of CSCL discourse. Moreover, the identification of the four message types in this data and the analysis of discourse strategies, used for cohesion and coherence and to maintain social interaction, contribute to the description of electronic discourse as a new register.

The reliability of the results and the reliability of the claims of the analysis will be assessed within this chapter by establishing that they are

(i) consistent with external evidence as reported in the literature review

(ii) consistent with established general linguistic principles

(iii) internally consistent.

The discussion of the results of the analysis is divided into a discussion of the six coding categories for message types, derived from the four basic message types, and a discussion of the more general discourse categories. The discussion of the message types in section 6.2. is organized by the same three main topics as the literature review to facilitate relating the results to these topics: (i) the description of electronic discourse, (ii) CMC as a social context and (iii) the conversational model of learning. This is done to present the

claim that the evidence for the existence of the message types, each with a separate communicative function, is sufficiently strong to generate a new hypothesis about CMC discourse. Section 6.3. presents the discussion of the results for the other discourse categories. As these categories tend to confirm results reported by other linguistic studies and consequently support the claims made for the analytic framework, the discussion is organized by discourse type and is less formally related to the topics of the literature review. Section 6.4 is the review of the research methodology, which includes the evaluation of the analytic framework. Section 6.5. offers a brief conclusion.

The discussion of the results precedes the evaluation of the analytic framework because establishing the internal consistency of the results and their consistency with external evidence is in itself evidence for the usefulness and reliability of the analytic framework.

6.2. MESSAGE TYPES-DISCUSSION OF RESULTS

The four basic message types identified in this data are prototypical schemas, comparable to Herring's (1996) basic message schema. The coding identifies six message types, to include the two variants of the interactive type and the mixed message type. The analysis of the coded data identified a specific structural configuration of conversational moves and associated core discourse features that prototypically characterise each type[1]. Nevertheless, some degree of variation is expected in the structural configuration of the message types, and in the extent to which the core discourse features are present, to reflect individual and situational factors at the time of message composition. In this analysis variation of one or two additional or misplaced conversational moves within the message structure was considered acceptable provided the main pattern of moves is established. In practice this entails that for example a message coded as an interactive type may include one (possibly two) account moves, or that a message coded as risky

---

[1] The structural composition and core features of each of the message types are presented in tables 5.2 and 5.3.

may include an instance of patterns of [account + formulation+ formulation] or [account + account + formulation], which deviate from the prototypical repeated pattern of [account + formulation]. This level of variation is consistent with general linguistic principles (Biber 1988, Crystal and Davey 1969). It thus supports the claim for the validity of the message types, based on the finding that all the messages in the data were coded as one of these types (results 1 + 2).

Observing the extent to which the set of four message types forms an internally consistent system also makes the linguistic argument for the validity of the message types, and this issue will be addressed in 6.2.1. The discussion will then continue to review the extent to which the message types display or explain the linguistic, social and learning behaviour identified within the literature review as characteristic of CSCL groups.

6.2.1. Message Types and Specialisation of Communicative Function

Each message type has been identified as performing a specific communicative function, represented informally by the labelling of the types as default, interactive, given or risky. Further, they form an internally consistent set through a division of the functional load between the message types. This is done in two ways. Firstly, the message types can be divided into information bearing types and conversational/group management types. Secondly, within this functional division two pairs of the message types are in a relation of complementary distribution. Division of functional load and the principle of complementary distribution are fundamental, general, linguistic principles.

As Davis and Brewer (1997) also observed in their study, the division of message types as information bearing or interaction focused is clearly marked in the results of this study. With respect to the information bearing specialisation, the default message type is characterised as a neutral vehicle for conveying a variety of kinds of information (result 3) and 44% of all learning platform messages are conveyed using the default message type. The most prevalent use of the given message type is to present feedback or to ask questions about the subject content (result 9) and 19% of all learning platform messages are conveyed through this type. The risky message type is characterised as textual and

crafted (result 10), and has its highest rate of occurrence in the learners' discussion of the subject content material (result 11).

In contrast, although the interactive message types make up a significant proportion of the data (43%), the occurrence of these types in the learning analysis categories is well below average. Neither interactive type is used for conveying learning platform messages. The interactive-directive type does occur in the subject-based discussion to give feedback or to ask for repair (results 5 + 6). However, there is a zero result for the occurrence of the interactive-social type across the learning analysis categories.

When totalled the information bearing message types (default, given and risky) make up 46% of all the messages in the corpus. When compared to the result that 43%[2] of messages are coded as one of the interactive type, this shows that within this CSCL task the participants did give more or less equal attention to group management and information content, as was intended by the task design (section 5.2.2).

Within this functional division, there is a relation of complementary distribution between the two interactive message types and between the default and given message types. The two interactive types are identical in structure and core features (tables 5.2 and 5.3). Similarly, the default and given message types are structurally identical. The distinguishing feature between them is the inclusion of high rates of pragmatic presupposition in the given type (result 7), which is not present in the default type (result 3). Nevertheless, the members of each pair are functionally specialised in a complementary manner.

The interactive-social message type is specialised to social orientation. 58% of all messages coded as interactive-social contain expressions of direct emotion. 38% convey aizuchi. Further, 32% of all expressions of direct emotion, 35% of azuchi and 25% of all self-repairs are conveyed through the interactive-social message type. In contrast, the

---

[2] The remaining 11% of messages are coded as the mixed message type.

interactive-directive message type is most commonly used for group management. 48% of messages coded as interactive-directive convey indirect commands, 47% convey direct requests for feedback, 30% convey direct commands (from the tutor or peer co-ordinator), and 30% convey expressions of direct emotion. Moreover, there is a clear correlation between the interactive-directive type and the discourse strategy of repair, which is in marked contrast to the results for the interactive-social type that is rarely used to convey repair (result 5).

The given message type differs from the default message type in the degree of pragmatic presupposition assumed. 65% messages of the given type contain expressions of anaphoric reference, 32% contain expression of cohesive echo (lexical or phrasal repetition). This contrasts with the low rates for these categories in messages of the default type. Only 21% of default type messages contain anaphoric reference, and 9% contain cohesive echo. Further, as shown in table 5.12, the given message type is characterised by higher than average levels of indirect meaning, with exceptionally high levels of expressions of epistemic uncertainty (result 8), in marked contrast to the rates for the default type messages on these categories that are well below the average. The choice of the given type message over the default type is therefore made to include this assumption of shared knowledge and at the same time to convey at least some degree of ownership of the ideas expressed in contrast to the neutrality of the default message type.

6.2.2 Message Types and the Register of CMC (Electronic) Discourse

As observed in the literature review (section 2.2.2.1), electronic discourse is regarded as a new linguistic register. However, there is little information at the present time as to the linguistic and situational features of the register of electronic discourse.

Despite an early characterisation of CMC discourse in terms of the oral/written dichotomy, this position has been superseded by the view that a register arises from situational factors and the cognitive constraints different forms of communication place upon speakers or writers, in a manner that cuts across the oral/written division. Further,

this is the approach that has been followed in this thesis through the use of general linguistic theories, which cut across the speech/writing boundaries.

Biber has been accepted as the leading writer on situational and cognitive factor analysis of different genres and in developing frameworks for the analysis of different registers. Most close studies of electronic discourse have been based in Biber's framework (e.g. Collot and Belmore 1996, Davis and Brewer 1997). They have concluded that electronic discourse displays some similarities to both professional and personal letter writing on Biber's dimensions of register.

The analysis in this thesis has not been conducted according to the same methodology as Biber's work. However, comparing the descriptions and profiles of the messages types to Biber's functional[3] descriptions for personal and professional letters on each of the six dimensions in his framework will produce a description that can then be compared to the results of Collot and Belmore's detailed linguistic factor analysis. This will show the extent to which the descriptions of the message types are consistent with other studies on electronic register, and the extent to which the message types are consistent with Biber's model.

Biber's first dimension is informational versus involved focus. Personal letters are characterised as non-textual, showing little lexical variation, and including a high frequency of private verbs, to express emotions, and frequency of Wh- questions. They are also described as having an exclusively interactive purpose. On the other hand, there is considerable variation in the style of professional letters and in the range of linguistic forms used. However, the distinguishing feature of professional letters is that they have both an interactive and informational focus, although the main bias is informational. There are few features that refer directly to emotions.

---

[3] As the coding of this data is based on pragmatic and not grammatical meaning, Biber's linguistic features are not analysed in this exercise.

The result in this study that the message types found are either information bearing or interaction focused has clear similarities to the situational factors on Biber's first dimension. Moreover, the characterisation of personal letters bears strong similarities to the profile and structure of the interactive-social message type, which consists of a structure of strings of adjacency pairs, has high frequency for the direct expression of emotions and is non-textual. Further, there is considerable variation between the information bearing message types (default, given and risky) in the style and degree of lexicalisation and lexical diversity, with the risky type marked as displaying high levels of both features in comparison to the more frequent use of conversational GCI in the default and given type messages.

The only apparent anomaly is the interactive-directive type. This can be partly resolved by comparison with Collot and Belmore's results on this dimension based on a factor analysis of lexico-grammatical items. Their results show that although one of the primary purposes of participating in the online discussion is to seek and impart information, the language used is similar to personal letters. In their study electronic discourse shows a moderately positive result on the involved end of the scale.

Biber's second dimension is narrative v non-narrative style and concerns. The criteria for this dimension are all linguistic features, which cannot be directly compared to the data from which the message types are derived. Nevertheless, the characterisation of the message types predicts that narratives, if occurring, would be conveyed using the default or given message types, with non-narrative texts conveyed through the risky type and non-narrative actions through the interactive types. Collot and Belmore found that electronic discourse has a low score on this dimension and conclude that in this respect the register is most similar to professional letters. Results on this dimension are, of course, related to the purpose of the communication, which in CSCL groups is both informational and procedural.

Biber's third dimension is situation-dependent versus explicit reference. In Biber's analysis personal letters are described as situation-dependent, as they contain linguistic

markers of reference to times, places and events that can only be correctly interpreted if the addressee has sufficient knowledge of the presupposed context. Professional letters, on the other hand, score highly on explicitness of reference. This clear dichotomy between personal and professional letters on this dimension is almost exactly reflected in the difference between the given message type, which contains relatively high levels of anaphoric reference and indirect meaning (result 7), and the risky message type, which is highly nominalized, contains few GCIs and has low levels of anaphoric reference. Moreover, the risky message type displays an unexpectedly high incidence of direct repetition (result 12), linking the content directly and explicitly to earlier messages. Collot and Belmore's results for this dimension show no clear conclusion as their score lies mid-point between the two extremes, and therefore makes no account of variations in ideational content, or communicative purpose.

Biber's fourth dimension is the overt expression of persuasion. This dimension is characterised by linguistic features that mark the speaker's assessment of the likelihood and advisability of an action or idea. In Biber's analysis personal letters have a moderately high score and professional letters have a very high score on this dimension. He explains this as an outcome of the argument structure, typical of professional letters, where different possibilities are explored and assessed before a conclusion (persuasive in nature) is reached. This account of suasion in terms of argument structure closely resembles the functional profile and structural characteristics of the risky message type. Further, there is a clear correlation between certain of the message types and indirect commands[4]. 62% of the mixed message type and 48% of the interactive-directive type convey an indirect command. On the other hand, the default message type seems to lack persuasive features (result 3). Collot and Belmore found that electronic discourse is situated between personal letters and editorials at the high end of the scale.

---

[4] In this analysis the indirect command category includes strong requests. See section 6.4.2 for a discussion of this point.

Biber's fifth dimension is non-abstract versus abstract information. This dimension is characterised by use of all types of passive and agentless constructions, typically used for procedural discourse. However, Biber's analysis shows that only academic prose and reports score significantly on this dimension. Overall, the features that characterise this dimension are rare in both Biber's corpus and in Collot and Belmore's corpus, and the dimension is not considered to have significant scope.

Biber's sixth, and final, dimension is online informational elaboration. The linguistic features that underlie this dimension are demonstratives and that-relative clauses. Functionally, the dimension measures the extent to which speakers make informational elaboration in relatively unplanned types of discourse. Online therefore refers to spontaneity of production and not to computer-mediated production. In Biber's analysis professional letters have a moderately high score on this dimension, although personal letters show a negative result. He (1991:159) explains the relatively unexpected result for professional letters as due to the use of "that-complements" for the elaboration of personal feelings or opinions, expressed through phrases like: " It is obvious that...", "I believe that.." "I think that...", which represent the speaker's stance to the information content of the text. These types of phrases, which he makes the distinguishing criteria for this dimension, are also typical of the category of epistemic uncertainty, which generates an inference through the Q-principle. Of all the message types, the given message type displays the highest level of occurrences of epistemic uncertainty (result 8). 23% of given messages include expressions of this kind, as compared to an average occurrence level of 12% across the message types. It is therefore highly likely that the given message type is similar to Biber's reading for professional letters on this dimension. Collot and Belmore arrive at a similar result, and score electronic discourse at a very similar level to professional letters.

In conclusion, this small exercise of comparison shows clear similarities between this study's message types and the functional descriptions of most of Biber's dimensions. It has been possible to plot at least one of the message types to all of the dimensions, except dimension 5: a result which is consistent with Biber's and Collot and Belmore's results

for this dimension. The consistency with which it has been possible to map the message types onto Biber's framework supports the claim for the validity of the message types as a description of a discourse type.

Moreover, this exercise of comparison generally supports the conclusion (Collot and Belmore 1996, Davis and Brewer 1997, Ferrara et al 1991) that the register of electronic discourse has similarities to personal and professional letters. However, it is unclear whether the similarities are, at least partly, a product of similarities in mode of production. Both letters and CMC discourse have interactive and informational purposes. Both are produced in non-real time conditions where production constraints do not apply.

Further, Biber's description of the professional letters register allows for considerable variation. It is a large and inclusive category. In contrast, the description of the register of personal letters is so constrained that only the interactive-social type messages can be included. Performing an analysis using a taxonomy of sub-registers within Biber's professional letters register might produce different results.

The issue of over-inclusiveness may also be relevant to considerations of the description of an electronic register overall. Even within a constrained social and informational context, as established by the CSCL task in this study, the characterisation of the message types indicate there is considerable variation in the types of discourse participants use to complete their task. Davis and Brewer's (1997) study of lexical diversity in online, adult, learning groups also indicated considerable variations in levels of diversity, with a marked increase where the speaker takes a guarded position in relation to the text. The analysis conducted in this thesis suggests that in CMC participants use a variety of registers, related to the overall purpose of the interaction, their communicative purpose within the message, and the level of commitment they adopt with regard to the ideational content.

6.2.3. Message Types and the Social Context of CMC

The variations in the functional purposes of the message types show that in this data, participants were concerned both with the exchange and joint development of information and with the maintenance of their co-operation. Moreover, their attention appears not to have been wholly transactional and instrumental, but directed towards the development of purposeful shared knowledge. The frequency of GCI implicatures and the high level of anaphoric reference, which characterise the given message type, indicate the assumption and presence of shared meaning and presupposed knowledge within the group (result 7). The given message type makes up 18% of the corpus, ranking fourth for frequency of occurrence, where the highest ranking (interactive-directive) message type scores 24% (table 5.9). There is therefore a strong sense of social presence in the online groups in this study (result 6).

However, the results also suggest that the members of this CSCL group were not keen to project a strong individual presence online, nor to project an alter ego or online persona. 23% of message in the corpus are coded as the default message type, which has been characterised as a neutral vehicle for conveying information (result 3). Further, those message types that entail the speaker's commitment to the ideational content of the message are either proportionally infrequent or characterised by hedging expressions (result 9, result 11). The risky message type, that entails a relatively high level of speaker commitment, as expressed through the argument structure, is only 5% of the corpus. Moreover, both the more frequent given message type and the risky type are marked by high levels of expressions of epistemic uncertainty (result 8, result 10).

The analysis also shows social presence in the form of the peer co-ordinators' strong leadership of the CSCL groups (result 15). This is indicated by the proportion of direct commands occurring in the data, a coding category that can only be used for messages contributed by the tutor or peer co-ordinators. Direct commands make up 20% of the corpus. 42%% of these are conveyed through the interactive-directive category and 25% occur in the mixed message type.

The mode of analysis used in the framework does not give information on appropriation of behaviours, or patterns of gendered behaviour or power relations, which are the broader social issues and categories discussed in the literature review (section 2.2.1). The focus of this thesis has been the pragmatic interpretation of meaning and it does not include measures for these categories.

6.2.4. Message Types and Deep-Level Learning

The model of deep-level learning that was developed by Pask and Marton and Saljo (section 2.3.2) is followed in this thesis by applying Laurillard's conversational model of learning to the task design. Laurillard's model is also used as a guide to the development of the learning analysis categories. The aim of this discussion is to examine how the message types are used to perform activities associated with deep-level learning, and especially to seek associations between specific message types and the learning analysis categories. The discussion also considers how the characterisation of the message types contributes to the communicative effect of the message content and purpose.

The default message type and the risky message type are highly prevalent in the learning analysis categories. Despite making up only 5% of the corpus overall, the risky message type occurs across these categories with frequency and distribution rates that are well above average. The default and risky message types are especially prevalent in the platform message category. 44% of platform messages are conveyed through the default message type, and 15% through the risky message type. This result is congruent with the characterisation of the message types. The default message type seems particularly suitable for this purpose, due to the exceptionally low levels of cohesive links that characterise this type, giving it a stand-alone feature. On the other hand, direct repetition of extracts from other messages is frequently used as a cohesive device in the risky message type (result 12). Further research is required to examine whether this contrasting feature affects the distribution of the risky message type for conveying platform messages.

The two questioning categories, Lp1 (stimulus) and Lp3 (focused feedback) are predominantly conveyed by the default message type and the interactive-directive message type, with a more or less equal spread across these types (range 20%-23% on each). Based on the characterisation of the message types, questions conveyed through the interactive-directive type must be adapted to the adjacency pair structure. They will therefore tend to be relatively short questions, often WH-questions, or responses to an adjacency pair move. In contrast, the default message type is structured around the account conversational move, and the questions will therefore be expected to be more textual and longer.

There is also a clear association between the Lp2 (repair) category and the given message type. 36% of Lp2 messages are conveyed through the given message type[5]. This result contrasts interestingly with the results for the general conversational category of repair (other-directed repair) that is performed mainly though the interactive-directive message type (51% of instances). The interactive type is barely used for subject content repair. The distribution of the two different message types across the two kinds of repair shows that these moves are performing different functions in this data. A repair conveyed through the given message type is more likely to be a genuine request for information than one conveyed through the action focused interactive-directive type.

Finally, as expected, direct challenges and forceful critique (Lp4) are mainly conveyed through the risky message type (31% of instances). This result is entirely congruent with the characterisation of this message type, with its highly textual rhetorical argument structure, high levels of explicitness and precision of reference and citation.

Summary

On each of the four dimensions addressed in this study the message types have been shown to display internal consistency as a set, external consistency with the literature,

---

[5] 24% of Lp2 are conveyed through the default message type and 20% are conveyed through the mixed message type.

and, where relevant, consistency with general linguistic principles. As a set the message types follow the principle of economy through specialisation of function and exhibit the relation of complementary distribution existing between two pairs of the message types.

Comparison with Biber's six dimensions gave readings for the message types on most of them, in a manner that is consistent with the descriptions of the message types, and with the findings of other descriptions of electronic register, based on Biber's framework. Moreover, despite differences in methodology, there is a good degree of consistency between the results obtained for the abstracted message types on Biber's dimensions of register and the analysis of raw data, undertaken by the earlier studies. This is taken as a strong support for the message types.

Analysis of the frequency of each of the message types within the corpus indicates various kinds of social behaviour that have also been widely observed and discussed in the literature. Finally, analysis of the distribution of the learning analysis categories across the message types shows strong associations between certain of the message types and the learning categories, that is congruent with the underlying communicative effects conveyed by the structure and core features of each of the message type. The result is further evidence of their specialisation of function.

6.3. GENERAL DISCOURSE CATEGORIES–DISCUSSION OF RESULTS

The results that are discussed in this section are the results for the general discourse categories, numbers 7 to 19 inclusive. In the previous chapter these categories are grouped as categories for conveying meaning indirectly (table 5.4) and directly (table 5.5), for maintaining topical cohesion (table 5.6) and for performing the conversational move of repair (table 5.7).

The results for the general discourse categories generally produce readings of the data that are similar to the existing literature on CMC discourse. This is helpful since it shows that, on the basis of conversational structure and pragmatic interpretation of meaning

over linguistic form, the framework can yield results that are comparable and similar to the results of a range of other studies.

6.3.1 Directness and Indirectness

In the analysis for this study directness is use of a direct speech act. This is to avoid ambiguity over what may otherwise constitute directness of expression. Five categories of indirect expressions of meaning are also considered. Three of the indirectness categories are based on Levinson's categories of GCI, and there was little difficulty in applying them. On the other hand, two categories (false repair and indirect command) were derived from the data and were much less straightforward to apply. In particular, the indirect command category is judged to be over-inclusive and in need of principled sub-division (result 16).

Directness of expression tends, in this data, to be targeted at group management, task completion (result 15) and the maintenance of social relations. The direct command category, which is available only to the peer co-ordinator and the tutor, whose roles satisfy the felicity conditions for giving authoritative directives, occur in 20% of the data. Direct requests for feedback are also prevalent (30%). Further, there is a strong association between direct speech acts and the two interactive message types and the mixed message types. For example, the average occurrence of direct commands across the message types is 19%. As presented in table 6.1, below, the interactive and mixed message types therefore convey expression of direct command considerably more frequently than the other three types. Indeed, the risky message type is never used to convey a direct command.

Message type	**Direct Speech Acts: Type and Percentage**
Interactive-directive	42% of direct commands 37% of direct requests for feedback
Interactive-social	32% of direct expressions of emotion
Mixed message type	25% of direct commands

Table 6.1. Percentage of direct commands in interactive and mixed message types

Direct speech acts are also extensively used in this data to express emotions. 34% of occurrences are conveyed through direct speech acts. These are typically speech acts expressing thanks, praise or congratulations. As it is usual in this data sample for participants to take a slightly guarded stance to the message content, through the prevalence of the use of the default message type or the hedging implied by the high occurrence of epistemic uncertainty in the given message type, the direct expression of emotion is marked behaviour. The contrast to the established norm amplifies the illocutionary effect of the speech act. This amplification effect, since it is contrastive and marked, in itself becomes an implicature of emphasis over the emotion expressed.

Clearly, this is recognition of the need to maintain social cohesion and critical mass. It is also a strategy to maintain the co-operative relationship. As Collot and Belmore (1996) observed in their corpus, expressions of emotion occur more frequently and are conveyed more explicitly than might be expected in the face-to-face equivalent. Indeed, actions directed to the management of the group and to task completion are both explicit and frequent, marking attention to the issues of poor participation rates, topic drift and poor task completion rates identified by Tolmie and Boyle (2000) (section 2.2.1.2).

The results for the five categories of indirect expression of meaning are less distinctive. Three of these categories, the epistemic uncertainty, indirect proposition and M-inference categories, are derived from Levinson's account of the GCI. The categories were not difficult to apply to the data. However, the results show relatively low levels of indirectness, as conveyed through these categories. Epistemic uncertainty occurs in only 10% of the corpus, indirect propositions occur in 17% and M-inferences occur in 18%. This reading suggests that in this data, there is a tendency towards explicitness of expression, achieved in the information bearing message types through textual and referential explicitness. This supports the observation that on Biber's third dimension (situation dependent v explicit reference) academically related CMC discourse is similar to professional letters.

Two of the indirectness categories, the false repair and indirect command category, were derived from the data. Both categories require review and possible revision. The result for the false repair category is low (2%). Moreover, only one individual in this study used this strategy. On the other hand, it is feasible that a study of a larger or more culturally diverse sample may show quite different results for this category. In contrast, the indirect command category is judged vastly over-inclusive. As a consequence, the result that rather a high proportion of messages (39%) contain an indirect command, is not particularly informative as the definition of indirectness used ranges from strong requests for action to implied expressions of advice. Modifications to the category will be discussed in detail in section 6. 4.2.

6.3.2 Cohesion and Coherence

Two categories were derived from the intensive reading of the coded data that represent discourse actions specialised to the function of maintaining topical cohesion and conversational coherence: referential anaphora and cohesive echo. Referential anaphora mainly concerns the use of pronouns, indexical (or elliptical) lexical expressions and demonstratives, which rely on the use of background knowledge and reference to external sources to arrive at the intended meaning. The meaning is most frequently arrived at through the activation of the GCI I-principle. Cohesive echo refers to a range of types of repetition, including repetition of titles (Crystal 2001, Davis and Brewer 1997), direct lexical repetition or quotation (Wilkins 1991) and more varied forms of reiteration through use of synonyms, paraphrase and antonyms. The frequency of use of adjacency pairs was also considered in this study, as this conversational move has been identified as significant in maintaining the conversational structure of CMC discourse (Condon and Czech 1996, Crystal 2001, Herring 1999) (section 2.2.2.2).

The structural composition of the four basic message types shows that adjacency pairs occur with very high frequency in this data (result 17). The interactive message types, which are structured around adjacency pairs, are the most prevalent message type. Moreover, the mixed messages types are closely associated with direct and indirect commands (typically conveyed through adjacency pair moves), conveying 19% of all

indirect and 25% of all direct commands. Notably, the risky message type that contains no adjacency pair move in its schematic structure has the lowest levels of occurrence overall (5%).

This study does not undertake an analysis of the different functional uses of the adjacency pair structure, other than though the coding of direct requests for feedback. Further, it is unclear, without further analysis, whether certain messages, coded as aizuchi, are part of an adjacency pair set.

The average rate of occurrence of anaphora in the corpus is 42%. As might be predicted within this study, the given message type has the highest level of occurrence. 65% of all given messages contain anaphoric expressions that are disambiguated using the GCI I-principle. Similarly predictable is the result that the default message type contains relatively few anaphoric references (result 3). In contrast, 54% of the interactive-directive message type and 28% of risky message type contain anaphoric references. These are rather high readings, especially for the risky message type. It seems that due to the textual nature of the medium, participants do assume that certain concepts and ideas can be incontrovertibly recognised and understood on the basis of the shared history of messaging. This contrasts somewhat with the explicitness of expression observed in the previous section and the question remains over how participants decide what has become shared ground: i.e. how they use anaphora pragmatically.

Cohesive echo, or reiteration, occurred on average across 20% of all messages in the corpus. Two message types deviated from this average. Cohesive echo occurs in only 9% of the default message type, thus supporting the hypothesis (result 3 and hypothesis 1) that messages of this type present as stand-alone (freestanding) units. In contrast, 44% of risky messages include cohesive repetitions from other messages (result 18). As observed in section 5.6.8, in risky messages the repetition occurs most frequently in the subject header and it serves an orientation function. This result parallels earlier observation that messages titles are significant in maintaining topical cohesion and coherence (Crystal 2001, Davis and Brewer 1997).

Nevertheless, other forms of reiteration, or cohesive echo, are used in this data, including use of quotation, direct repetition, elliptical phrases and coining of new terms that become part of the common parlance of the group. At present, the cohesive echo category is not sufficiently fine-grained to identify the distribution of the different types of repetition used. This category therefore should be sub-divided (see 6.4.2).

6.3.3. Conversational Strategy of Repair

There is almost no mention of the conversational strategy of repair in the literature on CMC. The *a priori* assumption in this study was that there would be little use of repair in text-based and asynchronous communication. However, this assumption proved interestingly incorrect. Three categories of general conversational repair were coded: self-repair, other-directed repair and false repair. In addition, there is a coding category (Lp2) for repair that is directly concerned with the subject content material. When the percentages of all the repair categories are totalled, this indicates that these repair strategies occur in approximately 24% of the messages. This is a result that is much higher than was initially expected.

The analysis shows distinctive patterns in the way in which each of the different repair strategies is associated with particular message types. Self-repair, which is often posted as an immediate add-on to an earlier message, is frequently conveyed through the interactive-social message type (25% of self-repairs). Further, 51% of general requests for repair are conveyed through the interactive-directive message type. The prevalence of the use of the interactive message types for general conversational repair contrasts markedly with the way repairs concerned with the learning material are conveyed. This is usually performed through the use of the given message type (36% of occurrences), the default message type (24%) and the mixed message type (20%).

If the functional validity of the message types is assumed, this leads to the interpretation that the general requests for repair are concerned with getting something done, whereas the learning probe repairs are more closely concerned with questioning and examining

the speaker's understanding (result 20). However, while this interpretation is broadly satisfactory, in the light of the absence of supporting evidence from the literature, a more accurate reading of result 20 is that it suggests a hypothesis about the use of the conversational strategy of repair (other-directed repair), which can be evaluated through further research.

Summary

In all the general discourse coding categories, there has been a clear association of communicative function with particular message types that is supportive of the specialisation of functional load discussed in section 6.2.1. The observed pattern of the interactive message types being specialised to group management and the given, default and risky message types being specialised to information exchange seems confirmed within the scope of this study.

The results of the study with respect to the structure of the conversation and the strategies used to maintain topical cohesion and conversational coherence replicate the findings of earlier studies reported in the literature review. Further, the attention to social cohesion and to co-ordination of the learning task also replicates the findings of earlier studies. One anomaly to the results of previous studies, as reported in the literature review, is the relatively high occurrence of the conversational strategy of repair.

Moreover, the analysis has produced some results, which are suggestive of CMC specific discourse strategies, but for which the coding categories are insufficiently fine-grained to provide informative or reliable readings. In particular, it is unclear how participants in the CMC discourse arrive at an understanding that certain referents can be treated anaphorically when there is a clear preference for explicitness of expression. Similarly, the cohesive echo category is presently insufficiently fine-grained to discriminate the different forms of reiteration that have been observed in the data and in the literature review. The modifications proposed for these categories will be addressed in section 6.4.2.

In conclusion, the results of the analysis of the general discourse categories are similar to the findings of the previous studies on discourse analysis of CMC transcripts reported in the literature review. Moreover, the results of this study that represent new information on CMC discourse are consistent with the analysis and discussion of the social and cognitive context of a typical CSCL group, that has been presented in the literature review. This level of consistency with external evidence supports the claim that the analytic framework used in this study is a reliable means to conduct a discourse analysis of CMC talk.

6.4. RESEARCH METHODOLOGY-DISCUSSION AND REVIEW

The main aim of this section is to address the claim that the framework designed for this study is a reliable tool for the analysis of CSCL talk. The crux of the claim is that it has been possible to design and apply a framework that is based in linguistic categories and where a reliable interpretation of meaning can be obtained by consistently applying pragmatic procedures.

This claim will be assessed firstly (section 6.4.1) with reference to the results of the analysis of the coding provided by the framework and secondly with reference to the criteria established in section 2.4.6 for the design of frameworks for CMC content analysis. Section 6.4.1 will conclude with a discussion of the ways in which the methodology developed in this thesis differs from the Discount scheme (Pilkington 1999), to focus on the solutions adopted within this thesis to issues also addressed by Discount. The review of the framework continues in section 6.4.2 with a discussion of proposed modifications to some of the coding categories.

Section 6.4.3 extends the discussion to a review of the research methodology. This section is mainly concerned with a review of proposed modifications to the methodology. However, this section also includes a discussion of the extent to which the framework could be automated.

The final part of this discussion of the methodology is concerned with a review of the trial project to use the coding for an examination of the occurrence of behaviour indicative of deep-level learning. The focus of the discussion is to determine the extent to which the trial could be considered successful.

6.4.1 The Analytic Framework

The analytic framework used in this study is based on well-established, general theories of conversation. This has the advantage of transparency of use. Although, there are no inter-rater reliability statistics available for this study, the criteria for coding and for the application of each of the three theories that constitute the three levels of the framework are well established and comprehensively described[6]. Further, there are expert models available for each of the theories, and in particular for Levinson's theory of GCI, which is a relatively new theory of pragmatics.

These theories describe the general management principles and structure of conversation in a manner that cuts across the oral/written divide. It is a mode of verbal interaction that is jointly constructed and negotiated. Conversation is therefore regarded as an appropriate model for the analysis as CSCL tasks are designed (section 2.3.1) to promote peer interaction and joint activity mainly mediated through talk. The task for this study (section 5.2.2.) was specifically designed to emphasise the centrality of discussion and joint decision-making. Within the context of CSCL, conversational models of analysis and of learning (section 2.3.2) are preferable to the more didactic approaches of analysis, such as the IRF structure, as used for example in Pilkington's (1999) work, since the power relations associated with the authority of the tutor or teacher to authenticate or verify student statements are diminished by the tutor's facilitative (cf.didactic) role.

Nevertheless, the range of levels of formality observed in conversation is broad. Conversation can be conducted in a structured and formal manner, involving a wide

---

[6] Grice's theory is discussed in section 3.4. Levinson's theory of GCI is discussed in 3.6 and the theories underlying levels 1 and 2 (Levinson's Activity Type and Conversation Analysis) are discussed in section 4.3.

range of lexical diversity, nominalization and explicitness of reference or it can be informal, elliptical and spontaneous. The variety of styles and structures described by the different message types in the results of this study represent this range. Moreover, the analysis of the coding provided by the analytic framework has been relatively successful. Firstly, the analysis has resulted in the identification of the four different basic message types. Secondly, the analysis has yielded results that closely resemble those of independent studies of the discourse of CMC academic discussion groups. Further, the coding and analysis discriminate between the message types in accordance with the basic linguistic principle of the division of functional load and in some cases in terms of the principle of complementary distribution. Thus, the argument (presented in 6.2 and 6.3) is that the results of the study, derived from the analysis of the coding, are consistent with external evidence and with general linguistic principles. They also form an internally consistent system.

A detailed discussion of the specific methodological issues, which the research for this thesis aims to address, can be organized around the set of six issues, which were identified in the review of the literature (section 2.4.6) as critical to the design of frameworks for the analysis of academically related CMC texts.

1. *Interpretation of the form-function relationship.*

As discussed in section 3.2, meaning is multi-componential and the meaning of talk put to communicative use in a context cannot be determined solely on the basis of the words and forms of expression used. There is often no literal mapping between propositional content or a speaker's intended meaning and the language used to convey these meanings. Further, the same form of expression may yield a number of different interpretations depending on the context and communicative purpose. Interpretation of meaning therefore is an inferential process, drawing upon multiple levels of information, as discussed in chapter 3. Specifically, the analytic task of form-function mapping is to reinstate as much of the contextual information interlocutors use to arrive at an interpretation of meaning as is required to reliably

establish what propositional content or illocutionary act the speaker intended to convey through a particular choice of words.

In the analysis of CMC transcripts the task of form-function mapping is made more complex by the computer-conferencing communications environment, for which there are still relatively few detailed, empirically-based studies to inform researchers on the ways in which participants adapt their communications behaviour to the altered psycho-social context (as discussed in section 2.2.).

Further, the transcript of a CMC discussion is not a planned and organized text, like letters, memos or newspaper articles, which allow the authors to agree upon the content and structure of the argument beforehand (Henri 1991:119). It is instead, a natural, evolving conversation, involving negotiation of meanings and points of reference and inevitably including redundancy and some garden path threads. Each message conveys a specific meaning in its own right and can be considered on its own. At the same time, the message is part of the collective endeavour of the conferencing discussion task. Thus strictly textual analyses, which rely upon knowledge of specific genres and conventionalised use of language forms to resolve the issue of form-function mapping, are not an entirely appropriate tool for the task (Henri 1991:118).

Where the analytic task is to examine learning processes in CMC, the concern is to understand how learners use the medium to work out and transmit their ideas, individually and collectively, and how they manage communicating in the altered interactive patterns of the CMC environment. This requires an approach, which goes beneath the surface meaning of the forms of expression used and examines a range of the dimensions involved in the interpretation of meaning. It has been argued in this thesis that language use and communication in CMC contexts is still under-researched, and that there is no established body of knowledge to draw on to facilitate the interpretation of messages. Therefore detailed attention to form-function mapping is required to understand these processes.

The work done within previous CSCL content analysis schemes can be discussed according to the focus of the content analysis: (i) analyses to examine the transcript for indicators of cognitive presence and cognitive activity (ii) analyses of the social dimensions of CMC (iii) discourse analysis of the transcript.

There are a number of CMC content analysis schemes, which are designed to examine transcripts for evidence of critical thinking and cognitive activity. The models and schemes considered here are prominent in the literature and include: Garrison et al's (2001) Practical Inquiry Model, Newman et al's (1995) analysis of critical thinking indicators, Mercer's 3-part scheme of talk types and reasoning through talk (Mercer 2000, Wegerif and Mercer 1997) and the cognitive and meta-cognitive dimensions of Henri's (1991) original content analysis framework.

All of these schemes and models provide a conceptual framework of the psycho-social elements of the communications context, and the inter-relationships between them. The categories for each of these elements are identified on the basis of empirical research and established learning theory frameworks, and indicators for each category are provided on the same basis. The indicators for the categories are often expressed as speech acts, e.g. agreement, self-introduction, initiating statement, direct questioning, which would, on the approach taken in this thesis appear to beg the question of the form-function relationship. However, the studies reviewed here are all based on an extensive body of educational research, using methodological procedures and approaches, which differ from linguistic practices. Drawing upon the research base allows the researchers in these studies to reliably infer that a particular type of language behaviour is indicative of a particular type of cognitive behaviour. It is concluded, therefore, that the purpose of these schemes is different from the purpose of this study and that the form-function issue need not apply in the same manner.

On the other hand, there is no equivalent theory of the social dimension of learner interaction CMC, and it is indeed one of the research tasks for which content analysis has been used (Fahy 2003, Goodyear 2002, Gunawardena et al 1997, Henri 1991, Rourke et al 1999). In the absence of a social theory of CMC, other types of conceptual framework are required to identify the categories for the analysis of social behaviour in CMC and the indicators for these categories. However, Fahy's (2003) Transcript Analysis Tool (TAT), and Henri's (1991) social dimensions, which are the two content analysis schemes for social aspects of CMC currently much cited in the literature, fail to specify the conceptual framework or theoretical procedures for the analysis. The TAT consists of comparisons of the frequencies and proportions of five categories, or sentence types, in a particular set of data. The definitions and criteria for the sentence types are expressed as speech acts (e.g. Type 4- intended to initiate, continue, engage or acknowledge), judgements of the speaker's commitment stance to the content (e.g. Type 3- thoughts, judgements, opinions, or information which are personal or at least somewhat guarded or private), identification of referential and non-referential statements and identification of question types.

The TAT is based on a relatively small empirical base, and in the view of this thesis fails to provide sufficient criteria for the identification of indicators. In particular the tool demands a functional interpretation of linguistic forms (to identify the speech acts), but fails to distinguish between direct and indirect means of expression, provides no account of procedures for identifying referential expressions and no account of how the communicative goals can be interpreted.

The social and interactive dimensions of Henri's (1991) scheme do include a formal distinction between direct and indirect expressions of meaning. However, no procedure is given for the identification or interpretation of indirect interactions other than to identify content, which "refers obviously to one or more messages or ideas, but does not specifically mention the connection" (Henri 1991:128). The argument of this thesis is that this is a surface approach to the analysis that fails to identify the underlying networks of meaning intentionally conveyed through indirect uses of

language. It also fails to provide reliable procedures for establishing what the content or meaning of a statement is, with the result that when the scheme is applied to data judgements of what is or is not an instance of a specific category tend to be subjective and arbitrary (Hara et al 2000).

The third set of content analysis schemes considered here are those that perform a discourse analysis of the transcript. One approach has been to use discourse analysis procedures to identify the unit of analysis. Henri and Rigault (1996) argue for the pragmatically defined "speech segment" as the unit of the analysis (section 2.4.1). However, the argument is circular since the communicative function of the speech segment needs to be identified to satisfy the definition. The function cannot be reliably interpreted without bottom-up processing according to pragmatic principles. Howell-Richardson and Mellar's (1996) argument for the speech act as the unit of analysis (section 2.4.4) is similarly flawed, as no account is offered for procedures for identifying or interpreting the speech act.

The Discount scheme (Pilkington 1999, Kneser, Pilkington and Treasure Jones 2001) (section 2.4.3, Figure 2.2) is based on a suite of three theoretical frameworks: the IRF exchange structure for educational dialogue, logical game theory and rhetorical structure theory. The IRF structure performs an initial mapping of the structure of the learning conversation, segmenting the text into exchanges, the speaking turns, which occur within the exchange, and the moves (speech acts) and propositions (ideational content) that make up the turns.

Form-function mapping is achieved through the instantiation of logical game theory and rhetorical structure theory. Logical game theory is used to model a principled method of establishing a typology of rhetorical functions that are typically used in educational dialogues to realize specific moves. This fulfils the task of establishing a reliable, and replicable, procedure for mapping form and function to arrive at an interpretation of speech acts. Analysis of the text within the framework of rhetorical structure theory shows how the representation of the propositional meaning of a

speaking turn is made through the use of rhetorical predicates. The ways in which predicates are used and, in particular, the choice of one predicate over another gives an interpretation of the text type and the communicative purpose, which in turn allows an interpretation of propositional content.

The Discount scheme fully addresses the form-function issue, which is to establish reliable and theoretically grounded means to infer meaning on the basis of the utterance. As research on the social, cognitive and communications aspects of learner interaction in CMC is still mainly exploratory, the importance of establishing appropriate procedures to resolve the form-function issue is that it makes possible detailed and reliable analyses of the transcripts to inform understanding of learner use of the medium. In turn, greater understanding and knowledge of learner use and adaptation to CMC, will inform the development of pedagogical models, learner group management, the types of interventions that might be made to promote learning and the development of evaluation procedures and schemes.

2. *Identification and definition of the unit of analysis*

Rourke et al (1999, 2001) identify five different units of analysis that have been used for content analysis of educational CMC transcripts:

- Proposition unit
- Sentence unit
- Paragraph unit
- Thematic unit
- Message unit

Other units, which can be added to this list, are the speech act unit (Howell-Richardson and Mellar 1996) and the speech segment (Henri and Rigault 1996).

Various kinds of difficulty have been reported with each of these units, and there is no clear consensus in the literature over what might be a reliable unit of analysis. A number of these units, including the proposition or "idea unit" (Hara et al 2000,

Newman et al 1995), the speech act and the speech segment are difficult to determine. As argued in the preceding discussion of the form-function relationship, identification of these units often requires complex philosophical definitions, and multiple interacting procedures of analysis. Further, in the review of the content analysis schemes undertaken in this thesis, identification of these units is considered to occur as a result of bottom-up processing. Thus, they are a product of the analysis and as such inappropriate as the initial unit of analysis.

The sentence (Fahy 2003) and the paragraph (Hara et al 2000) are grammatical and textual units. The main issue with these units is the "a priori" assumption (based on prescriptive grammatical rules) that the sentence (or paragraph) boundary is co-extensive with a single proposition. However, in practice a single sentence, as used in dialogue, can contain more than one proposition, or no proposition (Fahy 2001). Similarly, Hara et al found treating the idea-unit as co-extensive with the paragraph impractical and frequently coded the idea-unit at different levels within the paragraph. Further, a single proposition may be expressed over the span of a number of sentences. Ideational and interpersonal content is also conveyed in CMC messages in phrases or single words, which are not complete sentences.

The thematic unit tracks topic development. The episode level in the Discount scheme is an example of a thematic unit. This unit has not been included in the framework for this thesis, as the research has been conducted at the local level of the message. However, future refinements of the methodology may require inclusion of a thematic unit.

The message is used as the unit of analysis in the Practical Inquiry model (Garrison et al 2001, Rourke et al 1999) and in the research for this thesis. Taking the message as the unit of analysis is a practical solution, as the unit can be unequivocally identified (Rourke et al 2001). Further, the message is equivalent to a speaking turn, which is the central, pragmatic unit of Conversation Analysis. It is also a naturally occurring communicative unit for both the sender and the recipients.

Nevertheless, there are issues with the use of the message as the unit of analysis in this thesis. The main concern is that the unit changes with the level of analysis. Thus, it might be argued that the actual unit of analysis in this work is the conversational move at the second level of the framework. However, one of the main outputs of the analysis is a description at the level of the message. The information on the structure, content and linguistic properties of the message derived from the analysis are derived from an examination of its component parts.

3. Multi-level analysis across the same stretch of discourse

A full content analysis of CMC and CSCL transcripts involves examining the various elements of meaning present in learner interaction. Henri (1991) identified six dimensions for the analysis: social, interactive, participative, ideational (propositional), cognitive and meta-cognitive. An additional element of meaning for analysis in this research is to examine how participants engage in these elements of the dialogue through their choice of language.

Different theoretical frameworks are required to perform the analysis on each of these dimensions. A message or a part of a message includes aspects of some or all of these dimensions. Multi-levels of analysis are therefore required across a single stretch of text. In this research, the social, interactive and ideational dimensions are analysed through the application of the three theoretical levels of the analytic framework and the third level also provides a description of the way in which language is used. The participative dimension can be examined through an interaction analysis tool; but this dimension was not included in this study. The learning process was examined by seeking indicators of Laurillard's conversational model of learning within the transcript.

Further, the methodology used in this thesis derives from a theoretical model of meaning as a multi-componential construct. Interpretation of meaning is modelled as an inferential process, requiring input from a variety of sources, including linguistic,

general schematic knowledge and socio-cultural knowledge of the activity type. The interpretation also involves the disambiguation of referential expressions (including anaphora and cataphora) and of deliberate linking of messages through lexical repetition (represented in this analysis as the cohesive echo category).

Finally the methodology itself demands multiple passes over the same stretch of text. The framework performs a segmentation of the message as conversational moves. However, the illocutionary (speech act) and propositional content of these moves are determined by combining the outcome of the analysis at the third level of the framework with information inherited from the higher levels of the framework and additional information on felicity conditions and local contextual information (as obtained through the Principle of Coherence). Thus, a number of theoretical frameworks and procedures are required to identify the interactive and ideational content of even small parts of the message.

4. Definition and use of context

Understanding context is central to pragmatic theory, and specifically to the issue of the form-function relationship since contextual information enables interlocutors to favour one interpretation over another where more than one possible meaning can be attributed to an utterance.

The tradition of the Gricean inferential models of utterance interpretation is to treat context as a psychological construct. Therefore, the elements of context operative in a multi-party dialogue include shared schematic knowledge of the activity type in which the dialogue takes place, competence in the language in use, understanding of the social and discourse norms of the community participating in the dialogue, ideational knowledge of the subject content if this is specialised in some way, understanding of the goals of the activity and understanding of the participant roles adopted by interlocutors. A theory of context specifies the full set of operational variables and their inter-relationship.

This study does not include a theory of context. The pragmatic definition of context is thus underdetermined. Instead, one of the aims of the methodology is to establish reliable procedures for the analysis, and subsequent interpretation of speaker meaning, on the basis of the information provided by each of the pragmatic theories within the framework. This is also an attempt to replicate the minimal contextual information that can be assumed to be available to interlocutors in a CMC discussion at the level of the message, which is the unit of analysis. Further, this approach is considered practical for the study of educational dialogue due to the nature of the discipline and the large numbers of professional practitioners involved in the field. This study therefore, follows the procedure, which is usual in the reporting of educational research and classroom-based research, of describing the precise context of the learning event examined, to allow colleagues and other researchers to interpret the research. This is done mainly through the detailed specification of the activity type at the top level of the framework in combination with the full description of the learners' CSCL task.

Contextual information is also obtained through the segmentation of the message into conversational moves, at the second level of the analytic framework, and the mapping of implicature, according to GCI type. This information has been analysed into the message types, and each message type adds an element to the reading of context. For example, a message, which displays the properties of the interactive message type, is typically informal in content and mode of expression, and it presupposes that replies will be made within the adjacency pair structure. Similarly, a risky message sets a communications context that is more formal, structured and more challenging of others' ideas, requiring closer attention of the recipients in making a reply. Thus the patterning of each individual message and the patterns of clusters of messages provide information on the style of the dialogue participants are engaged in at different times.

At the third level of the analytic framework, an interpretation of the propositional content of the move and the speech act it performs is made. It is at this level that the

issue of the form-function relationship has to be resolved. The solution adopted in this study was to operationalize the view of meaning discussed in chapter three represented by the analytic framework.

The first task is to make an initial interpretation of the conversational move, by passing the text through Levinson's account of the Gricean scheme of meaning. The lexical-grammatical meaning is worked out for direct meaning. For indirect meaning, an initial is interpretation made on the basis of a combination of the lexical-grammatical choices made in the text, the interpretation of implicature (specifically GCI), and the information inherited from the two higher levels of the analytic framework. Moreover, at the level of implicature, as GCI's are default implicatures (that arise independently of context) only PCI's need to be interpreted with reference to a specific context. There were very few incidents of PCI in this data sample.

These procedures gave an approximate interpretation of the content and communicative purpose of the conversational move. Two further types of contextual information, which are traceable at the level of the message, were then introduced to refine the interpretation. The first is the identification of the presence of felicity conditions for the speech acts supposed by the initial reading. This could be obtained, at least in part from the detailed description of the activity type. The second is to trace links to other messages.

Three types of inter-message link were followed. The first were direct links, achieved through computerised message-threading or direct repetition. The second were implicit links achieved though non-direct forms of repetition (coded within the cohesive echo category). The third type are discourse structure links, made through adjacency pair sets. These links were followed up to apply the Principle of Coherence (for the identification of indirect speech acts) and to disambiguate referents.

This set of procedures was sufficient for the researcher in this study to form an interpretation of the speech act and the propositional of the conversational move,

which was replicated by multiple passes of analysis over a period of months. However, this does not exclude the possibility that some degree of subjective judgement was involved in the interpretation, particularly as the researcher was a participant-observer in the conferences in the study. Further research is therefore required to establish the reliability of these procedures to test for and measure inter-rater reliability in the reading of the form-function relationship.

5. *Sensitivity to changes in use or changes in meaning associated with content, or group specific concepts and lexis.*

Many frameworks for the analysis of CMC transcripts are made up of broad top-down coding categories. Further, as noted, the units of analysis defined for many of the frameworks reviewed in chapter 2 are difficult to sustain across different levels of analysis. This makes it difficult to track changes of use of specific concepts or lexical items, even though shifts in conceptualisation of terms is at the core of the progression to deep-level learning.

The framework within this study is able to capture changes in meaning, or changes in the associations to particular lexical items or terms, because each conversational move is coded individually. Coding at the third level of the framework should indicate a reading for each move that is close to the speaker's intended meaning. However, mapping the changes in meaning associated with a specific lexical item can only be done manually using the current research methodology. It relies on a separate level of observation and analysis that involves the researcher tracing the development of the usage of targeted lexical items. While this procedure is possible, it has not been undertaken within this thesis.

6. *Inclusion of interaction analysis of message direction in addition to content analysis.*

Interaction analysis of the direction and clustering of messages is required in a comprehensive analysis of CMC transcripts to map the patterns of the joint construction of knowledge, the distribution of messaging among the participants and

to provide information on topic cohesion and coherence, that is not managed through the automated threading of messages. The methodology used for the coding of the data in this study takes account of the computerised threading of messages, and the structure of the conversation. However, there has been no separate interaction analysis that could provide valuable additional information. This is an issue to address in the review of the modifications to the research methodology (section 6.4.3).

The final part of this review of the analytic framework is to compare the framework to the Discount Scheme to focus on the different ways in which these two approaches have addressed a very similar analytic task. There are three main differences. These are (i) the approach to the segmentation of the transcript, (ii) the approach taken to address the form-function issue and (iii) the approach to the interactional mapping of the educational dialogue.

Discount takes the exchange structure theory as the method for the segmentation of the transcript into conversational moves. Exchange structure theory was originally developed in the 1970's on the basis of extensive observation and analysis of classroom-based talk. The original IRF structure represented the social and power relations typical of teacher-pupil dialogue in teacher-centred classrooms. It modelled teacher behaviour to question pupils to elicit responses, which the teacher would then accept or reject. Moreover, this uneven relationship of power and control is still embodied within the coding of the initiating move for synchronous communications, where the first speaking turn in an exchange determines the topic development and predicts the responses that will be made.

However, in the altered social and communications conditions of asynchronous CMC, the choice of how to respond to an initiating message and thus how to develop the topic lies with the recipient and not the sender. Moreover, CMC dialogues, and CSCL dialogues in particular, evolve as multi-branching, threads, forming a distributed network of connected moves, which challenges the hierarchical and linear structure of

the IRF. For this reason, in this thesis the segmentation of the messages is performed using a general conversational structure. It is anticipated that this approach will meet the aim of identifying how the participants in the CSCL task structure and map their conversations, in a manner which avoids the implications of pre-structuring the analysis using models developed for face-to-face interactions.

Secondly, Discount resolves the form-function issue using a typology of rhetorical functions used to realize specific moves (speech acts) in educational discourse, and a typology of rhetorical predicates to track the development of ideational content and to inform the interpretation of propositional content. The approach in this thesis is to make an interpretation of the speech act and propositional content for each individual move. This was done to make a detailed and grounded description of the ways in which participants in CMC dialogues convey meanings, for the purposes of forming hypotheses. However, it is a very time-consuming and laborious procedure, useful and practical only until sufficient information is collated through further research to identify reliable discourse indicators, as has been done in the Discount scheme.

Finally, the Discount scheme and the analytic framework developed in this thesis differ in the approach proposed to the mapping of the interactional structure of the conversation. In Discount the mapping of the moves is made through the transactional exchange structure (IRRc + RI), and the higher level 'episode', which maps topic development. This coding made within these theoretical structures also provides information on the dialogue roles adopted by the participants, and can lead to a profile of an individual participant's activity in the dialogue and to a mapping of the topic development.

In this study, the proposal is to conduct a manual interaction analysis, to track connections participants make between messages using direct forms of linkage, such as made through computer-threading systems or explicit lexical links, made through direct repetition or citation. Implicit means of linkage, identified as indirect repetition (including paraphrase, use of synonyms, hyponyms or moves that complete an

adjacency pair set) are also included. The main advantages of a manual interactional analysis are that this approach tracks the direction of messaging, and identifies focal messages and topic clusters, which do not automatically conform to pre-imposed dialogue structures. A manual interaction analysis can also track back-references and linkages across a wider span of messages than described by the exchange structure, as for example, when a topic or thread of discussion is taken up for an otherwise self-standing reply after one or more new topics have been introduced. This is an observed feature of asynchronous CMC, although the typical size of the intervening message span in relation to the perception of currency of the back-referencing message is undetermined. Further, when cross-referenced to the content analysis the interaction analysis provides information on the focus of the messages, whether this is group management, social interaction or discussion of the subject content.

In conclusion, the purposes of the Discount scheme and the analytic scheme developed in this thesis differ. The schemes also differ in their level of development. The Discount scheme provides a replicable, valid and effective means of identifying argument structures in educational discourse, based on a range of theoretical frameworks and databases of empirical study. The aim of this research is to attempt to provide detailed descriptions of how participants adapt their behaviour in the CMC environment. This has involved detailed and time-consuming manual analysis, which is intended for the purposes of making hypotheses, which can be examined through further research.

6.4.2 Modifications to Analytic Framework Categories

As noted the framework is based on three, separate, established, linguistic theories that are comprehensively described in the literature. This has contributed significantly to ease of use and transparency in applying the coding categories to raw data.

Difficulty in applying the coding in this study was experienced only in the distinction between the account and formulation categories at the level of Conversation Analysis (the second level of the framework). This difficulty arises as, according to the definitions followed (Grundy 2000), the key discriminator is the degree of veracity

the speaker attributes to the proposition. In a study of this kind, which is based in linguistic pragmatics, it proved difficult for the researcher to discriminate on the basis of a rather general criterion. Further specification of prototypical linguistic indicators of a subject's commitment to the veracity of the statement would need to be established in order to retain consistency with the approach taken in this thesis.

However, whereas the application of the coding categories for the analytic framework proved overall transparent, a number of the general discourse categories, which were derived from an intensive reading of the coding, are in need of modification. The categories identified as requiring modification are:

- Indirect command (category 10)
- Cohesive echo (category 16)
- Anaphora (category 17)

Two other general discourse categories require further research to understand the nature and purpose of their use:

- False repair (category 8)
- Aizuchi (category 7)

The indirect command category is over-inclusive. In its current form it has to be applied to all types of directives that are contributed by group members, who are not the course tutor or the peer co-ordinator. This is because in this study the felicity conditions for issuing a command have been interpreted as satisfied only by appointment to a position of authority. As a consequence, the indirect command category has been used to code a wide range of directive statements, ranging from direct speech acts of command, (e.g. "Correct me if I'm wrong), or advice (e.g. I strongly advise changing the order) to indirect speech acts of request or suggestion, often expressed as rhetorical questions (e.g. How about this wording for question 4?).

The indirect command category clearly needs to be divided into a number of finer-grained and more descriptive coding categories, which nevertheless must retain the

opposition to the direct command category, which is used to code the direct speech acts contributed by the co-ordinator or tutor. One way in which this might be done is to firstly replace the term "indirect command" with the term "directive". Secondly, two coding categories for directives are proposed; directives which are conveyed through direct speech acts (directive 1) and those conveyed through indirect speech acts (directive 2). Within these two categories further sub-divisions can be made. For example, at least two possible narrow range scales can be recommended for the directive 1 coding category: (i) direct commands at one end of the scale and strong requests at the other end (ii) direct speech acts of advice to direct speech acts of suggestion. These scales can then be repeated for the coding of directives that are conveyed through indirect speech acts or through conversational implicature (directive 2). This proposal successfully retains the criterion of the felicity conditions of command that is vital to distinguishing the coding application of the direct command category, but also has the advantage of permitting indirect commands contributed by the co-ordinator or tutor to be coded more accurately than is currently the case.

The cohesive echo category requires less radical modification. The modification proposed to this category is to sub-divide the category into a hierarchical branching structure to provide more information on the location and nature of the reiteration. The first level of branching is to distinguish location. Does the reiteration (echo) occur in the title or in the body of the message? The next level of branching concerns the form of reiteration. If in the title, is it an exact quotation from an earlier message title, a pun, a synonym or antonym or simply an elliptical keyword? If the reiteration occurs in the body of the message, is it in the form of a block quotation or a paraphrase, or is it a type of lexical reiteration? Probing the nature of the cohesive echo in this way will provide useful information on the strategies used to achieve cohesion in the CMC transcripts. Moreover, this information is also expected to enrich the descriptions of the message types.

The cohesive anaphora category should also be sub-divided into a hierarchical branching structure to provide more detailed information on the types of concepts and referential

objects that are judged by the participants in the discourse as suitable for anaphoric reference. In its current, flat structure form the category provides information on the extent to which anaphoric reference occurs in the transcript. This is important information, since it indicates that the interlocutors have developed a common ground and are able to make pragmatic assumptions about what this common ground might be. However, the next stage of research into the nature of the CMC discourse should examine how decisions concerning common points of reference are made. Development of the category for the coding of anaphora, in the manner proposed, should assist in this task.

Two other general discourse categories have been identified in the discussion as requiring further research to investigate the scope and the possible validity of the categories. The false repair category was not a widely used strategy in this data. Nevertheless, it is conceivable that this strategy, which does occur quite frequently in face-to-face conversations, might be used in CMC contexts. Analysis of a larger range of transcripts is required to investigate the occurrence and distribution of this conversational strategy. The aizuchi category is open to similar comment. In face-to-face contexts, aizuchi can be used to convey the second or third part of an adjacency pair set. The coding performed in this study does not discriminate this use.

6.4.3 Modifications to the Research Methodology

Intensive reading of the patterns revealed by the coding categories of the framework has yielded a number of consistent results. Further research will show if other aspects of the framework and the research methodology are in need of modification. Nevertheless, at least two modifications to the methodology are immediately obvious if two key issues are addressed. The first is that the methodology used in this study is extremely time-consuming. This is acceptable for the purpose of creating hypothesises for further research, but is impractical as a methodology for conducting larger scale studies or evaluation studies. It is therefore necessary to address the question of the extent to which the framework can be automated. The second issue is that the methodology used in this study does not include a separate interaction analysis, which provides information on the direction, rate and distribution of the messages in the transcript. Interaction analysis of

CMC transcripts can provide an additional level of information on sociological patterns and topic development that is not available through recording clusters of computer-threaded messages alone.

In principle, it is possible to automate the second (Conversation Analysis) and third levels (Gricean/Levinson analysis of meaning) of the framework, except for the category of particularized conversational implicature (PCI). Moreover, in this data, there are few occurrences of PCI. Preparation for automation of these levels would involve drawing up lists, based on frequency counts, of the prototypical linguistic expressions and structural compositions of phrases used to convey each of the categories in CMC contexts. Some work in this area has already been done, for example Collot and Belmore's (1996) list of adjacency pairs that includes a catalogue of preferred and dispreferred responses. Moreover, Levinson's work on the GCI heuristics is not only comprehensive in the use of examples, but also argued in sufficient detail to allow researchers to apply the principles more widely.

Although it might seem reasonable to allow a generic description of the activity type (the first level of the framework) to apply to a large number of messages, and thus to be easily adapted to automation of the analytic process, this is not actually the case. As observed in this study although the description of activity type following Levinson's criteria is comprehensive and fairly exact, it can always be refined in specific contexts of use. Moreover, the identification of general communicative goals within a specific context of use assists in the interpretation of speech acts, and in the interpretation, if relevant, of the communicative purpose of a GCI. Within this study, the definition of goals was re-visited for each message in order to obtain a more exact reading of speaker meaning in the message. It is possible, therefore, that while certain parts of the framework can be automated, for the purpose of research, the final reading of the meaning content of a message should be interpreted on the basis of the individual message and cumulatively across the levels of the framework, as in this study. For the purpose of evaluation, the more general criteria may be applied.

On the other hand, interaction analysis can be performed relatively easily. Even a simple form of interaction analysis can provide useful information on the rate and distribution of messaging among a specific population, and also show the direction of messaging, indicating the level of uptake of topics. Further, an interaction analysis, like the approach developed by Howell-Richardson and Mellar (1996), and reproduced in the study by Hara et al (2000), is designed to identify forms of inter-messaging referencing that are not performed through computer-mediated threading of messages. This allows enrichment on the interpretation of topic development and on the nature of interaction that is especially useful to evaluation studies that typically address both content analysis and the quality and extent of participation.

Within this thesis, analysis of inter-message linking is restricted to the interpretation of the individual message. Thus it is used to establish message threads, to disambiguate referents, to establish levels of anaphora or reiteration (cohesive echo) and to determine the conversational move (for example adjacency pairs). Although this approach has been productive in revealing structural compositions in the message types, a broader approach that is more sensitive to the jointly constructed nature of conversation would be preferred. Moreover, an interaction analysis that identifies inter-messaging referencing in fine detail and maps the patterns of topic development can be informative in determining the temporal span or quantity of messages relevant to the choice of anaphoric reference over nominalized reference in cases where formality and textual constraints (i.e. choice of the risky message type) are not of primary importance.

6.4.4 Review of Categories for a Conversational Approach to Learning

The categories for the analysis of the conversational approach to learning were derived from the data as an exercise (referred to as a mini-trial) to examine whether the coded data, produced by the application of the framework, could be used for the analysis of behaviours identified by an external theoretical model as conducive to deep-level learning. Following the same procedure as for the derivation of the discourse categories, the learning analysis categories were obtained through an intensive reading of the coded data for each message, with particular reference to the interpretation of the meaning

conveyed and the speech acts performed that the coding allows. The main difference in the aim of the research methodology was to narrow the approach to seek patterns of behaviour and ideational content of messages that are consistent with the cyclical and dialogic approach described by Laurillard's model of conversational learning.

Laurillard's is a general conceptual model of deep-level learning, and the mathemagenic activities refer to the cognitive processes of the individual learner. However, the methodology used in this study did not identify indicators for the categories that could be applied directly to the data. Some interpretation was therefore required, on the basis of Laurillard's model and Marton and Saljo's description of deep-level processing, to form the learning analysis categories.

The objective in the learning analysis was to select from the data types of verbal act that fit with the description of the process of deep-level learning. Six categories were identified (table 5.8). A definition and example for each category is provided in section 5.5.7. The purpose of this discussion is to establish (i) the extent to which the categories are predicted by the task design, (ii) whether they are consistent with the results of the discourse analysis, and (iii) the extent to which they instantiate Laurillard's model of learning.

The measure of rates of occurrence shows that, as a group, the learning analysis categories occur on average across 14% of the corpus. When broken down by individual category (table 5.15) both the platform and meta-comment messages occur within 16% of the data, a prompting question (Lp1) occurs within 19%, and focused feedback (Lp3) within 18%. As might be expected, there are lower occurrence levels for requests for repair (Lp2- 7%) and direct challenges to a colleague's conceptualisation of the subject matter (Lp4-4%). This rate of distribution is quite consistent with the aims of the course module (section 5.2.1) and the task design (section 5.2.2). The task was designed to require considerable attention to the management of the group, as part of the reflexive process of understanding the practice of CSCL, but it also focused attention on the academic subject content through the interview task. The finding, therefore, that

approximately one-fifth of the messages within the data examined is specifically concerned with addressing the academic content shows that a very reasonable proportion of time and attention was dedicated to the conceptual aspects of the learning task. Moreover, this simple count of activity rate, on the basis of the learning categories, is in itself informative about the extent to which behaviour leading to deep-level learning has taken place.

As discussed in 6.2.4 analysis of the distribution of the learning categories across the message types shows consistency with the specialisation of function of the message types and the system formed by the group of message types. The full argument of this issue is presented in section 6.2.4. It is appropriate here only to briefly recap the main points. Following the division of functional specialisation, the learning categories are found in the information bearing message types (result 9 and result 11). There is a notable absence of the occurrence of the learning categories in the interactive-social message type (result 6) and proportionally low levels of occurrence in the interactive-directive type. Moreover, the use of the given message type to request repair with regard to the learning material contrasts significantly with the strong association that exists between the interactive-directive message type and general conversational repair. This indicates a difference in the communicative use of the two repair categories (result 20).

Further, use of the information bearing message types carries the association of a lack of full commitment to the veracity of the message content, which is embodied in the structural composition and core features of these types. This is conveyed by the relatively high levels of the occurrence of expressions of epistemic uncertainty within the risky (result 10) and given (result 8) message types and the impersonal style of the default message type (result 3). It has been observed in section 6.2.4 that the pattern of distribution of the learning analysis categories reflects the particular characteristics of each of these message types.

Moreover, the pattern of distribution of the learning analysis categories across the message types differs from the pattern described by the distribution and rates of their

occurrence across the corpus as a whole (table 5.9). This is particularly evident in the case of the risky message type, which constitutes only 5% of the data overall, but is prevalent in the analysis of the learning categories (table 5.10). There is, therefore, overall consistency between the way the message types are being used in the discussion of the learning material and the learning analysis categories that were derived from the coded data as evidence of deep-level learning behaviour. Thus although the two sets of category types are derived from quite different theoretical models, there is a good level of functional match between them. This is further evidence for the validity of the set of message types.

The remaining question is to consider whether the learning analysis categories instantiate Laurillard's model of learning. One way to do this is to compare the definitions of the learning analysis categories with the definitions of the mathemagenic activities, which are individual cognitive processes. The purpose is to establish the extent to which the analysis was accurate. The results of this comparison are presented below in table 6.2.

Learning analysis category	**Mathemagenic activity instantiated**
Platform	(ii) integrating conceptual relations (iv) using feedback to adjust goals and concepts
Lp1-prompt/stimulus	(v) negotiation to agree a mutual interpretation of subject concepts and task goal.
Lp2-repair	(v) negotiation to agree a mutual interpretation of subject concepts and task goal.
Lp3-focused feedback	(iv) using feedback to adjust goals and concepts
Lp4- direct challenge	(ii) integrating conceptual relations (iv) using feedback to adjust goals and concepts (v) negotiation to agree a mutual interpretation of subject concepts and task goal
Meta-comment	(v) negotiation to agree a mutual interpretation of subject concepts and task goal

Table 6.2. Instantiation of Laurillard's mathemagenic activities in the learning analysis categories

The comparison shows that the learning analysis categories seem to perform at least three of the mathemagenic activities, but do not appear to directly accomplish the activity of apprehending structure or of relating theory to practice. This is a surprising result because the learning task was a reflexive task, which also required reading of the literature. It was designed to encourage the participants to relate theory to practice, and to consider the textual arguments on the topic (i.e. to apprehend structure through deep-level reading). Moreover, the relative prevalence of the risky-type messages across the learning analysis categories would seem to support the view that deeper-level engagement with the arguments of the subject matter did take place.

Further, although it was possible to derive clear definitions for each of the six categories used in the analysis, the comparison shows that the match between these definitions and Laurillard's definitions for the mathemagenic activities is approximate and general. The conclusion is, therefore, that these categories only partially instantiate Laurillard's model of learning.

The main explanation for this is that the analytic categories were derived from the data rather than from Laurillard's model. The difficulty reconciling these raises doubts about the use of these formal categories to support an analysis driven by a different theoretical starting point. Instead, specific sets of indicators for each of Laurillard's five activities need to be identified, through a separate level of theoretical analysis. Within the context of this research, the coded data allows for indicators to be developed across at least four separate dimensions: (i) indirect and direct expressions of meaning (ii) rhetorical structures at the level of the message and across clusters of messages (iii) propositional content (iv) inter-message referencing. If the methodology includes an interaction analysis then this information would be included within the fourth dimension.

The conclusion is therefore that it is not possible on the basis of this exercise to establish whether the coding provided by the analytic framework data can be used as data for separate theoretically-driven analysis.

Summary

The review of the research methodology has argued that it has been possible to design an analytic framework, based on a suite of pragmatic theories, that acts on language use and requires only restricted use of subjective judgement to apply. The framework is judged successful both in terms of the results obtained and according to the criteria established in the literature review for the development of such frameworks. In particular, the framework permits a definition of the unit of analysis, which is conceptually simple and simple to apply with consistency.

The modifications proposed to the research methodology mainly concern modifications to certain of the analytic categories that were derived from the coding and the inclusion of a separate interaction analysis study over the same set of data to supplement and complement the findings of the discourse analysis. The discussion also included consideration of the extent to which the framework and research methodology can be automated. The conclusion is that while certain parts of the framework can be automated, the overall interpretation of speaker meaning has to be performed manually. However, this is a topic for further research.

Examining whether the coded data could be used for a non-linguistic, theory-driven analysis further tested the framework. The results of this trial showed that the coded data could be used for this purpose.

6.5. Conclusion

The two claims made for this research study have been upheld. The linguistic and functional characterisation of the four basic message types and the general discourse categories, derived from the coding provided by the analytic framework, have been shown to be consistent with external evidence (as reported in the literature review) and with general linguistic principles. Further, the research methodology, that involved three separate passages across the same sample of coded data, reveals high levels of consistency across the results of the different forms of analysis. In particular, the

specialisation of communicative function attributed to the message types is borne out. The patterns of association, that the characterisation of each of the message types predicts, between the message types and specific discourse categories and specific learning analysis categories, are confirmed.

The group of the four basic message types forms an internally consistent set that operates according to the general linguistic principles of the division of functional load and complementary distribution. A number of paradigmatic, and contrasting features that create different communicative effects and are put to use in specific ways have already been identified by the analysis of the distribution of the message types. However, it has also been argued that other paradigmatic contrasts related to functional use are still to be addressed. For example, the analysis indicates that differences in levels of reiteration and inter-message referencing, may be relevant to the speaker's use of the default or risky message types for conveying platform messages. Other similar patterns may be uncovered through further analysis.

The framework proved relatively easy for this researcher to apply. Moreover, the results obtained from the coding provide exceptionally clear and consistent patterns for analysis. However, the most significant aspect of the success of the framework is that the coding is performed through the application of general linguistic principles over conversational structure and linguistic form. This approach has allowed high rates of consistency in the application of the coding categories that increases the reliability of the results. Further, this enhances comparability between the different groups in this study and with other possible future coding samples.

The aim of this study, as reviewed in this chapter, has been to create hypotheses about the nature of CSCL discourse and approaches to analysis. The framework has allowed the description of the message types, and thus facilitated the formulation of a new hypothesis about electronic register. Since it is easy to use and produces consistent results, the framework may also be a candidate for development as an evaluation tool for CSCL discourse. However, the use of this framework raises questions about the use of context,

some of which this chapter has already begun to consider. The implication is that the framework can give some detailed information on the content of a conversation, without recourse to a theory of context. The issue, which will be addressed in the next chapter, is the extent to which this might be considered a satisfactory account of meaning.

The implications of the results of this study for research methodology, the description of electronic register and evaluation of CSCL courses will be discussed in the next, and final, chapter.

CHAPTER 7: REFLECTION

7.1. INTRODUCTION

The aim of this thesis has been to develop a framework for the content analysis of CSCL discourse. The framework consists of a suite of established pragmatic theories, structured across three levels with a default inheritance relationship between them. The design has proved effective for its purpose in four respects. Firstly, the categories within the framework are directly derived from established theories so that there are expert models available for the coding criteria. Secondly, the main unit of analysis (i.e. the message) and the sub-unit (the conversational move) are both easily identifiable and are natural discourse units. Thirdly, the framework provides a methodology that, since it is conducted through a process of induction over linguistic structure and form according to established pragmatic theories, is replicable. Fourthly, the framework performs a detailed qualitative analysis of the data that could possibly be automated and used as a tool for evaluation.

As discussed in chapter 6, the analysis of the coded data has revealed clear patterns in speaker behaviour, that are consistent with existing descriptions of CMC discourse and with general linguistic principles. Moreover, the evidence for the identification of four types of communicative message structure within this study has been sufficiently compelling to form a new hypothesis for the description of the register of CSCL discourse.

The aim of this chapter is to conclude the thesis by reflecting on the theoretical and practical implications of this research for the three main areas addressed by the study:

- Research methodology
- Description of CSCL discourse
- Evaluation of CSCL and CMC courses

The chapter concludes with a brief discussion of directions for further research suggested by the review of the research methodology and results, which was undertaken in chapter 6.

7.2. RESEARCH METHODOLOGY

The key methodological issue raised by the results of this research study is the role and use of context in an analysis of speaker meaning in CMC. Within this study, context is undetermined and in practice the only contextual information used in the coding and analysis was the general schematic information provided by the analysis of the activity type. Nevertheless, the coding for each message provided an account of speaker meaning, and the analysis has identified the four communicative message types and the relationships between them. Therefore, it was possible to conduct a type of discourse analysis without a theory of context.

The implications of this research are:

- not all speaker meaning is context-specific
- as CMC environments are a new social and discourse context, a medium specific theory of context may be required
- the framework developed in this thesis may or may not be suitable for the analysis of talk conducted across other types of communications media.

Not all speaker meaning is context-specific.

This directly challenges the position of those who argue that all speaker meaning is interpreted inductively within specific contexts of use[1]. Nevertheless, the boundaries for the input of contextual information in the interpretation of meaning are very fuzzy.

In this study, which claims to work with much reduced levels of contextual information, much depends on the participants' and researcher's skill in the activity type. The account

---

[1] For example the school of Relevance theory, as discussed in 3.5

of meaning provided by the coding is a probabilistic account, arising from an inductive process of reasoning over the prototypical uses of the conversational moves in the activity type as well as the processing of linguistic meaning according to Gricean principles. Clearly, the greater the participants' (and researcher's) experience of the activity type involved, and the greater their skill in acting within it, the clearer the meaning of the message will seem to the intended recipients in the CMC discussion group. Thus, it has been assumed in this research study that a common schematic account of the socio-cultural event engaged in (or the "language game" in play) is the minimum contextual informational needed to arrive at an interpretation of meaning.

On the other hand, the characterisation of the message types identifies for each type certain core features that automatically become part of the meaning of the message content. Further, the structural composition of each message type carries a level of meaning, as observed by the functional specialisation of the message types. The ideational content, specifically propositional meaning, the speech acts performed and the illocutionary and perlocutionary acts conveyed, is overlaid onto the communicative structure of the message type. The four message types, identified in this study, are not context variable or context specific, but they do have a communicative function.

The type of analysis, used in this study, which focuses on the structural properties of the message and default and prototypical meaning, does not provide a precise account of speaker meaning. This would require that a theory of context be included in the research methodology. However, the analysis has provided a description of the nature and functionality of at least some of the moves in the language game under examination. That is to say it has provided information about the rhetorical moves used in the activity type in this study: post-graduate CSCL. Further research over large sets of comparable data is required to examine the validity of the description and the functionality of the message types. Nevertheless, the clarity of the results in this study does suggest that CSCL talk is structured around particular types of conversational moves. The study has also shown that research into the formal and structural properties of discourse is informative.

As CMC environments are a new social and discourse context, a medium specific theory of context may be required.

As discussed in the literature review (chapter 2), CMC environments are characterised by a unique set of constraints and affordances that are specific to the medium. CMC is a social and discourse context, that differs from other discourse contexts. As a result, users adapt their behaviour to the environment. Practical examples of this adaptation have been observed in the data analysed in this study. Some examples from the analysis include the four different uses of the conversational strategy of repair, and the preference for explicitness of expression, particularly for the expression of emotions. Other, rather well documented, examples include the strategies used to maintain topical cohesion and conversational coherence in asynchronous CMC discussions.

The methodology used in this thesis has shown it is possible to take general linguistic theories and apply them productively to CMC contexts. It should similarly, at least in principle, be possible to apply general theories of context in a manner that would reveal the unique characteristics and functionalities of the medium.

The framework developed in this thesis may or may not be suitable for the analysis of talk conducted across other types of communications media.

The research methodology used in this study is atomistic, formal and logical. It has revealed some clear results in the analysis of CMC transcripts, which, like letters, are both interactive and produced in non real-time conditions. Like letters, CMC messages are composed without the input of parallel sources of information. In face-to-face or synchronous, audio communications, feedback and interruptions can cause the speaker to make modifications, elaborations or self-repairs within a single speaking turn. However, this does not occur in CMC contexts. Each message is an independently produced unit, consciously linked (or not) to other messages in the transcript. It is a psychological and textual entity. The analytic framework has proved productive in the analysis of CMC asynchronous messaging, but can it also be used for the analysis of synchronous, overtly and jointly constructed talk?

The framework is constructed on general linguistic theories of conversation that should apply across all modes of production. However, modifications were made to the Conversation Analysis categories to adapt this level of the framework for use with transcripts of asynchronous CMC. Similar minor modifications to this level are expected if the framework is to be used with other media. Analysis of face-to-face conversation, or video-conferencing, would retain the original version. Further, the initial unit of analysis entered at the top level of the framework should be adapted to the medium. In asynchronous CMC, this unit is the message, which has been treated in this study as equivalent to the speaking turn. In synchronous conversation, whether computer-mediated (e.g. Chat, IRC) or face-to-face, the unit should be the speaking turn, as in the original theory of Conversation Analysis.

Finally, there is the issue of which types of conversation the framework can be used for. As noted, the methodology does not include a theory of context. However, it has been successful in the analysis of conversational moves within a specific activity type. The conclusion is, therefore, that the framework is designed for the analysis of talk that is goal directed and conducted within an activity type (or specific language game), and it is unlikely to be useful in the analysis of general conversation.

7.3. DESCRIPTION OF CSCL DISCOURSE

This thesis has addressed three aspects of CSCL discourse:

- strategies for conversational management
- linguistic register
- evidence of deep-level learning

The purpose of this section is to discuss the theoretical and practical implications of this research study with regard to each of these aspects.

Strategies for conversational management

In keeping with the results of earlier linguistic studies on strategies for the maintenance of topical cohesion and conversational coherence, this study shows that participants in the

CSCL task make extensive use of adjacency pairs and of lexical repetition (particularly in message titles) to structure their conversation. Moreover, as observed in the literature, different forms of reiteration, including quotation, use of synonyms, antonyms and direct repetition (in full form or elliptical) of newly coined terms, are also used to structure and manage the conversation. In its present form the "cohesive echo" category, used in this framework, codes the existence of these different forms of reiteration, but is insufficiently fine-grained to provide information on their distribution. One of the recommendations of the previous chapter is that this category should be modified to provide for an analysis of this information.

One type of discourse strategy that was moderately prevalent in this analysis, but which has not been discussed in the literature, is conversational repair. The analysis revealed four different types of repair move, each of which was typically conveyed by a specific message type. Moreover, each type of repair was observed to perform a different communicative function. The use of the repair move has in this study been found to be purposeful.

Linguistic register

Previous descriptions of the linguistic register (also called electronic register) of online academic groups have been developed from analyses of lexical density, lexical diversity and analyses based in Biber's framework of register types. These studies have concluded that participants use a relatively narrow range of styles. The register has been described as similar to that of personal letter writing, ranging from a relatively casual and chatty style to a more elaborated, textual style for the exposition of ideas.

The set of message types that have been identified within this analysis encompass this range. Moreover, the message types have been shown to be broadly compatible with Biber's descriptions of the register of both professional and personal letter writing, and with the results of studies of CMC register based on Biber's methodology. The evidence for the message types has been sufficient to form the hypothesis that they are a feature of CSCL discourse. If this hypothesis is supported, the identification of the message types

has achieved a more detailed level of description of the linguistic register of this discourse type than was achieved previously.

One practical application of obtaining such descriptions is to provide information for those involved in the training of academic writing skills, and in particular for the training of non-native speakers of English. With the increase in the provision of online education, this information will be of significant value.

Evidence of deep-level learning

The study has also sought evidence for deep-level learning. The analysis, which was conducted by intensive reading of the coded data, considered the distribution of the message types, the speech acts performed within the message, the interpretation of speaker meaning and the topic focus of the message.

The analysis identified six categories, which were considered to be behaviours indicative of deep-level learning. The results of the analysis show a predictable relationship between these categories and the distribution of the message types, which is broadly consistent with Laurillard's conversational model of learning.

However, the categories only partially instantiated Laurillard's model. Consequently, it was only possible to provide a limited account of the extent to which deep learning took place. This occurred because the relationship between Laurillard's theoretical model and the categories derived from the data was complex rather than one-to-one.

Nevertheless, analysis of the learning behaviour is an essential and integral part of the content analysis. A separate theoretical analysis, focused on the cognitive dimensions of the transcript provides information on how the participants in the CSCL group deal with the conceptual material on an individual basis, and how they jointly construct and develop their understanding and interpretation of this material. This information, which is at the heart of an analysis of a learning group, cannot be obtained through a discourse analysis alone.

Moreover, an attempt was made in this thesis to map cognitive behaviour to the ways in which the participants used language. This was done through examining the ways in which the message types were used for specific types of rhetorical functions, and through examining the ways in which direct and indirect forms of expression were used in representing meaning, presenting critique and asking questions. Although this attempt was not entirely successful, if this mapping were achieved through parallel analyses, it would lead to the construction of a typology of indicators for the identification and analysis of learning in online groups.

It is the recommendation of this thesis that the analysis of deep-level learning has to be addressed by the content analysis scheme.

7.4. EVALUATION OF CSCL AND CMC COURSES

Evaluation of CMC and CSCL courses has for quite some time been mainly conducted through the use of quantitative measures of participation and interaction analysis. Content analysis schemes have proved much more difficult to construct and implement with accuracy and consistency. One reason for this difficulty is lack of consensus over the unit of analysis. As observed in the literature review (section 2.4), many attempts have been made to define the unit of analysis, few of which have survived beyond a single trial application. A second reason is the volume of the transcript. As these transcripts rapidly reach unmanageable proportions, adequate theoretical models of CMC pedagogy and interaction are needed to motivate sampling criteria. At present, these models are under construction.

A third difficulty lies in determining the focus and scope of the evaluation tool. According to Salmon's five–stage model of the life cycle of an online learning group, participants are engaged in different forms of activity at different stages. Moreover, access and socialization precede and underlie engagement with the learning material. Yet,

since online learning groups are prone to quite high levels of dropout and are dependent on effective management, many may fail to reach the point of purposeful, subject-related information exchange and knowledge construction. Alternatively, in practice, the knowledge construction stage may be dominated by a minority group of active participants. Therefore, similar to the issues of CMC course design, the current concerns of CMC course evaluation are to establish that interaction takes place across the whole course population[2] and that the quality of the interaction and discussion at each stage is of the required standard and directed to appropriate goals.

Content analysis schemes that consist of broad based categories, for example Mercer's description of talk types in CSCL contexts, are sufficient to meet the general aim of quality control. However, although applying Mercer's description in this way allows for the identification of different types of learning behaviour it does not include categories for other types of behaviour, such as group management or social interaction.

One of the arguments made by this thesis is that the analytic framework addresses a number of the issues of content analysis design. One of the main advantages of the methodology is the definition of the unit of analysis and the criteria provided by the framework to break down the unit into its component parts for detailed levels of analysis. Moreover, the coding the framework performs covers all types of behaviour. It can therefore be used to obtain a content-based profile of the interaction at any point, even through random sampling. The output of the framework is a coded description. The value judgement entailed by course evaluation is made through the interpretation of this description.

The research methodology developed in this thesis potentially offers three different kinds of evaluation that can be performed once the sample from the transcript has been coded using the analytic framework. Firstly, intensive reading of the full set of information provided by the coding categories for each message provides a very detailed level of

---

[2] This is the focus of an interaction analysis.

analysis. Different forms of analysis can then be conducted at the level of the message or across wider spans of cohesive texts. As has been the case within this research study, this procedure may also prove hypothesis generating. Secondly, the coded data can be used as input for a separate, and independent form of analysis. This procedure was followed to establish evidence of behaviours consistent with Laurillard's conversational model of learning. However, as was observed in the discussion of the learning analysis categories (section 6.4.4) and in the review of content analysis schemes (section 2.4), the core issue in applying theoretical models to the coded data is the matter of identifying verbal behaviours instantiating the theory.

Thirdly, an analysis based on the distribution of the message types would give a profile of the focus of the interaction and the types of communications the participants are engaged in. The *a priori* assumptions of this kind of analysis are that the characterisation of the message types and the patterns of association of message type and communicative function, which appear so clearly in this study, are shown through further research to be valid. Further, it is anticipated that more rigorous analysis of the cognitive indicators of learning behaviour might also reveal associations between the message types and Laurillard's mathemagenic activities.

At present, the most basic level of information provided by an analysis of the distribution of the message types establishes the extent to which the conversation is information-focused or group-focused. This can be achieved by making simple quantitative records of the occurrence and distribution of the information bearing message types and of the two interactive types. The approach can be developed, to facilitate formative evaluation for example, by establishing templates of prototypical sequences and combinations of message types that represent behaviours, associated with the learning cycle of a CSCL or CMC group. Salmon's five-stage model of online learning offers one version of this learning cycle, and it would be feasible to map a template of message types onto each of the stages of her model. The results of the distribution of the message types obtained through the learning analysis study conducted in this thesis demonstrate how this might be done.

The analysis revealed that when participants engage in a phase of joint knowledge construction (Salmon's fourth stage), there is a change in the distribution of the message types. There are two obvious markers. Firstly, there are no occurrences of the interactive-social message type in the main body of the conversation. Secondly, and conversely, there is a marked rise in the frequency of the risky message type. Further, the sharp differences between rates of occurrence of the message types that characterises the general discourse are evened out when the topic focus is intensive discussion of the academic subject matter, and the three information-bearing types and the interactive-directive type occur, on this analysis, at approximately the same rate.

This study has also observed that a platform or meta-comment message is usually followed by a period of questioning, using all three of the question types developed by the learning analysis. Further, a specific message type typically conveys each of these categories. It is therefore possible to develop a prototypical schema for the sequence of message types that is associated with a period of intensive discussion of the learning material.

Finally, one of the recommendations of the review of the research methodology (section 6.4.3) is to supplement the content analysis with an interaction analysis. Interaction analysis of CMC transcripts traces the direction of messaging, the frequency and the distribution of messaging across the population. This allows the researcher or evaluator to identify topic clusters, to monitor the spread of messaging across the population and also to observe the extent to which individual participants are embedded in the discussion. The extent to which a message contributed by an individual attracts comments and replies is a rough measure of the peer group's assessment of the quality and authority of the contribution. If the messages of a particular individual repeatedly attract comment, then this is a sign of being deeply embedded in the online discussion.

is a separate analysis. But this information enriches the interpretation derived from the processing of the data through the analytic framework, thus enabling the researcher to develop a broader and more comprehensive understanding of the event.

7.5. DIRECTIONS FOR FURTHER RESEARCH

The research in this thesis is a pilot study, intended to generate hypotheses about how participants in CSCL groups manage their learning and social interactions through the ways in which they use language. Since the study is a pilot, the first research tasks are to refine and improve the research methodology and to further test the methodology and the results by using the framework for the analysis of a range of wider sets of comparable data.

The specific aims of the development of this pilot study would be to:

- Verify and validate the results obtained for the message types.
- Attempt a mapping of indicators of cognitive activity to the message types and the discourse categories identified by the research for this thesis.
- Develop typologies of indicators, based on patterning of clusters of the message types and the distribution of the discourse categories, which could be used to identify behaviours prototypically related to the social, interactive, and cognitive dimensions of the online discussion.
- Test and refine the method for the derivation of the propositional content of the message, to increase reliability and to reduce the labour involved in the existing methodology.

If this were achieved, then further research on the methodology might follow a number of different directions.

One possible research direction is to use the methodology to collect more information on the social, interactive and learning processes of CSCL groups. There has not to date been an extensive study based on content analysis of large sets of data, using a single

methodology. Obtaining a large set of comparable data would inform theory on the management of online groups and the development of pedagogical models for course design.

Another possible direction for research is to develop the methodology as a sampling tool. Thus for example, the analysis of the transcript performed by the framework would identify certain patterns in language use indicative of the communicative behaviour participants are engaged in. This information would provide a tutor with an overview of the development of the discussion, thus reducing the amount of time tutors need to spend reading online messages. Further, the occurrence of certain types of patterning could be used to alert a tutor to the need for intervention and provide possible cues as to the nature of the intervention.

A similar application is to use the methodology for the identification of relevant sets of interaction for other forms of educational research. The transcripts of online discussions quickly become very large, and include substantial amounts of textual contributions. The methodology developed in this thesis may provide a means to explore discussion threads to identify threads and clusters of messages, which are of particular relevance to the research question.

Another area of research, for which the methodology has relevance, is language-based research into qualitative reasoning. This branch of educational research investigates how learners conduct their exploration of conceptual material, and how they develop their arguments in relation to these concepts through their social interaction with others mediated through language. The focus of this branch of research is therefore to examine the ways in which language is used in the reasoning process and to identify rhetorical structures and linguistic indicators for the different ways in which people approach problem-solving and engage in arguments to present their reasoning. In this thesis, Mercer's work on exploratory talk and the Discount scheme, are examples of the work undertaken in this field. One possible line of enquiry is to further investigate the distribution and functional and linguistic characteristics of the risky type message, and to

compare this with Mercer's exploratory talk. Another possible development is to consider in detail the ways in which the framework developed in this study compares and contrasts with the Discount scheme and to attempt, in particular, to develop procedures for the interpretation of ideational content and the mapping of topic development in order to contribute to the body of knowledge on the rhetorical structures of dialogues concerned with the understanding of concepts and conceptual modelling of events and phenomena.

The analysis has also raised a number of general issues about the linguistic analysis and description of CMC talk. Three specific issues arise directly from the analysis.

The first is the requirement to refine and modify certain of the general discourse categories, and specifically those used for the analysis of topical cohesion and conversational coherence. The recommendation is to sub-divide both the "cohesive echo" and "anaphora" categories within a hierarchical branching structure to provide a more fine-grained and detailed analysis of the use of these discourse moves. The indirect command category was also observed to be over-inclusive, but requires further research to identify the separate speech acts currently subsumed by the coding criteria for this category.

The second recommendation is to examine the communicative uses and purposes of the four different types of conversational repair, which were observed to be relatively prevalent in this study, but which have not been addressed in the literature.

The third outstanding issue arises from the use of the given message type and its complementary relationship to the default message type. Preference for the given message type, and particularly in an intense discussion of the academic subject matter for example, entails the assumption that certain information and concepts are commonly shared by the speaker and their audience, and do not need to be repeated. This is to say the message type involves pragmatic presupposition. The question arising from this is how participants determine that pragmatic presupposition is appropriate. What are the conditions and constraints that enable them to decide that certain concepts are part of

their shared, common ground? Is this related to temporal factors, frequency of use of the concepts, lexical markedness or other factors?

7.6. CONCLUSION

The aim of this thesis was to develop a methodology for the analysis of CMC and CSCL discourse that can be conducted rigorously according to linguistic principles. This has been achieved.

As discussed in sections 2.4 and 7.2, much of the previous research in this area has involved making inferences over what participants might *mean by choice* of a particular form of expression and the mapping of top-down categories to parts of messages. Identification of an appropriate unit of analysis, which can be used for the huge diversity of types of message composition and the range of possible interactive patterns in CMC and CSCL courses, has also proved difficult. There is a vast discourse analysis field to be explored in online learning. This thesis has set some guidelines for future research.

The effectiveness of the framework is such that it is possible for further research to:

1. Identify indicators, which are based in the speaker's choice of expression and the ways in which the conversation is structured, for the analysis of the social, interactive and cognitive dimensions of CMC-based learning groups.
2. Examine the rhetorical structures and rhetorical argument structures typically used in online learning groups, and in collaborative learning groups in particular. This will inform research on the management of online groups, and contribute to research on modes of reasoning in co-operative group work.
3. Establish a more detailed and accurate description of the register of CSCL discourse. A description of electronic register would of practical use to those involved in the training and induction of novice users of CMC learning environments, and of specific benefit to learners who experience literacy difficulties in the genre of UK online seminars.

In conclusion, this research has shown that:

1. The application of basic linguistic principles and procedures over language form and structure can provide a rich source of information, including some contextually variable information.

   It has been the argument within this thesis that a theory of context is required to make a complete analysis of the transcript. Further, a theory of context would be based in socio-cultural theory, and thus bring to the interpretation of the analysis levels of information, which have been excluded in this research study.

   Nevertheless, as this research has shown, considerable information can be obtained on the ways in which participants in online groups structure their interaction and jointly construct knowledge by observation of patterns of language use.

2. The ways in which the participants in this study have adapted their communicative behaviour to the CMC environment is purposeful and systematic. Moreover, the set of message types form a communicative and functional system that differs from other genres. This has led to the hypothesis that the use of the message types and discourse strategies observed are not unique to the learning community in this study, but a feature of online interaction.

References

Adriansen, L., & Hjlemquist, E. (1985) **Small group communication in two media: Face-to-face and computer-mediated communication** (Goteborg Psychological Reports No.15 (1)).

Ahern, T. C., Peck, K., & Laycock, M. (1992) The effects of teacher discourse in computer-mediated discussion. **Journal of Educational Computing Research, 8** (3), 291-309.

Antaki, C. (Ed.) (1988) **Analysing everyday explanation**. London: Sage.

Antaki, C. (2000) Why I study talk-in-interaction. **Psychologist, 13** (5), 242-243.

Atkinson, J. M., & Heritage J (1984) **Structures of social action: Studies in conversational analysis**. Cambridge: Cambridge University Press.

Atlas, J. D., & Levinson, S. C. (1981) It-clefts, informativeness, and logical form: Radical pragmatics. In P. Cole (Ed.), **Radical pragmatics** (pp. 1-61) New York: Academic Press.

Austen, J. L. (1962) **How to do things with words**. London: Oxford University Press.

Bach, K. (1981) Referential/attributive. **Synthese, 49**, 219-244.

Bach, K., & Harnish, R. M. (1991) Linguistic communication: A schema for speech acts. In S. Davis (Ed.), **Pragmatics: A reader** (pp. 231-241) New York: Oxford University Press.

Baker, M., Hansen, T., Joiner, R., & Traum, D. (1999) The role of grounding in collaborative learning tasks. In P. Dillenbourg (Ed.), **Collaborative learning: Cognitive and computational approaches** (pp. 31-63) Oxford. Elsevier.

Bakhtin, M. (1981) **The dialogical imagination** (C. Emerson, M. Holquist, Trans.) Austin: University of Texas Press.

Bales, R. F. (1950) **Interaction process analysis: A method for the study of small groups.** Reading, Mass: Addison-Wesley.

Bales, R. F. (1955) How people interact in conferences. **Scientific American, 192** (3), 31-35.

Barnes, D. (1976) **From communication to curriculum.** Harmondsworth: Penguin Books.

Barnes, D., & Todd, F. (1978) **Communication and learning in small groups.** London: Routledge and Kogan-Paul.

Bartlett, F. C. (1932) **Remembering.** Cambridge: Cambridge University Press.

Baym, N. K. (1995) The emergence of community in computer-mediated communication. In S. G. Jones (Ed.), **Cybersociety** (pp. 138-163) Thousand Oaks, California: Sage.

Beckwith, D. (1987) Group problem-solving via computer conferencing: The realizable potential. **Canadian Journal of Educational Computing, 16** (2), 89-106.

Belbin, R. M. (1995) **Team roles at work.** London: Butterworth: Heinemann.

Biber, D. (1986) Spoken and written textual dimensions in English: Resolving the contradictory findings. **Language, 62** (2), 384-414.

Biber, D. (1988) **Variations across speech and writing.** Cambridge: Cambridge University Press.

Blakemore, D. (1992) **Understanding utterances.** Oxford: Blackwell.

Bliss, J., Monk, M., & Ogborn, J. (1983) **Qualitative data analysis for educational research: A guide to uses of systemic networks.** London: Croom Helm.

Branscomb, A. W. (1994) Jurisdictional quandaries for global networks. In L. Harasim (Ed.), **Global networks: Computers and international communications** (pp. 83-103). Cambridge, Mass: MIT Press.

Brochet, M. G. (1985) **Effective moderation of computer conferences: Notes and suggestions** University of Guelph Computing Support Service.

Brown, A. J., & Dowling, P. C. (1998) **Doing research/reading research: A mode of interrogation for education.** London: Falmer Press.

Brown, G., Malmkjaer, K., Pollit, A., & Williams, J. (Eds.), (1994) **Language and understanding.** Oxford: Oxford University Press.

Brown, G., & Yule, G. (1983) **Discourse analysis.** Cambridge: Cambridge University Press.

Brown, J. S., Collins, A., & Duguid, P. (1989) Situated cognition and the culture of learning. **Educational Researcher, 18** (1), 32-42.

Brown, P., & Levinson, S. C. (1987) **Politeness: Some universals in language usage.** Cambridge: Cambridge University Press.

Bruner, J. (1996) **The culture of education.** Cambridge.MA: Harvard University Press.

Burge, J. (1994) Learning in computer conferences contexts: The learner's perspective. **Journal of Distance Education, IX** (1), 19-43.

Calvani, A., Sorzio, P., & Varisco, B. M. (1997) Inter-university cooperative learning: An exploratory study. **Journal of Computer Assisted Learning, 13** (4), 271-280.

Carston, R. (1991) Implicature, explicature, and truth-theoretic semantics. In S. Davis (Ed.), **Pragmatics: A reader** (pp. 33-51). Oxford: Oxford University Press.

Carston, R. (1995) Quantity maxims and generalised implicature. **Lingua, 96,** 213-244.

Chafe, W. (1982) Integration in involvement in speaking, writing and oral literature. In D. Tannen (Ed.), **Spoken and written language: Exploring orality and literacy** (pp. 35-53). Norwood, N.J. Ablex.

Chi, M. & Bassock M. (1989) Leraning from examples. In L.B. Resnick (Ed.) **Knowing learning and instruction: Essays in honor of Robert Glaser** (pp.251-282). Hillsdale, NJ. Lawrence Erlbaum.

Chi,M, Bassock,M, Lewis, M, Reimann, P & Glaser R. (1989) Self-explantions: How students study and use examples in learning to solve problems. **Cognitive Science, 13,** 145-182

Clark, H., & Marshall, C. (1981) Definite reference and mutual knowledge. In A. Joshi, B. Webber, & I. Sag (Eds.), **Elements of discourse understanding** (pp. 10-63). Cambridge: Cambridge University Press.

Clark, H. H., & Haviland, J. (1977) Comprehension and the given-new contract. In R. Freedle (Ed.), **Discourse production and comprehension** (pp. 1-40). Hillsdale, N.J.: Lawrence Erlbaum.

Clark, H. H., & Schaefer, E. F. (1989). Contributing to discourse. **Cognitive Science, 13** (2), 259-294.

Clark, H. H., & Wilkes-Gibbs, D. (1986) Referring as a collaborative process. **Cognition, 22**, 1-39.

Clarke, A. A., Connolly, J. H., Garner, S. W., & Palmen, H. K. (1996) A language of cooperation? In J. H. Connolly & L. Pemberton (Eds.), **Linguistic concepts and methods in CSCW** London: Springer.

Coates, J & Cameron, D (Eds,), (1988) **Women in their speech communities.** Harolw: Longman

Cole, P. (Ed.), (1978) **Syntax and semantics: Pragmatics.** New York: Academic Press.

Cole, P. (Ed.). (1981). **Radical pragmatics.** London: Academic Press.

Cole, P., & Morgan, J. L. (Eds.), (1975) **Syntax and semantics: Speech acts.** London: Academic Press.

Collis, B. (1996) **Tele-learning in a digital world.** London: International Thomson Computer Press.

Collot, M., & Belmore, N. (1996) Electronic language: A new variety of English. In S. Herring (Ed.), **Computer-mediated communication: Linguistic, social and cross-cultural perspectives** (pp. 13-27) Amsterdam: John Benjamin.

Condon, S., & Cech, C. (1996) Functional comparisons of face-to-face and computer-mediated decision making interactions. In S. Herring (Ed.), **Computer-mediated-communication: Linguistic, social and cross-cultural perspectives.** (pp. 65-80) Amsterdam: John Benjamin.

Connolly, J. H. (1996) Some grammatical characteristics of cooperative spoken dialogue in CSCW contexts. In J. H. Connolly & L. Pemberton (Eds.), **Linguistic concepts and methods in CSCW** London: Springer.

Connolly, J. H., & Pemberton, L. (Eds.), (1996) **Linguistic concepts and methods in CSCW**. London: Springer.

Coombs, N. (1989) Using CMC to overcome physical disabilities. In R. Mason & A. Kaye (Eds.), **Mindweave: Communication, computers and distance education** (pp. 180-185) Oxford: Pergamon Press.

Cooper, M., & Selfe, C. L. (1991) Computer conferences and learning: Authority, resistance and internally persuasive discourse. **College English, 52** (8), 847-869.

Cope, B., & Katantzis, M. (Eds.) (1993) **The powers of literacy: A genre approach to teaching writing**. London: Falmer Press.

Crook, C. (1994) **Computers and the collaborative experience of learning**. London: Routledge.

Crook, C. (2002) The campus experience of networked learning. In C. Steeples & C. Jones (Eds.), **Networked learning: Issues and perspectives** (pp. 323-341). London: Springer

Cystal, D. (2001) **Language and the Internet**. Cambridge: Cambridge University Press.

Daniels, H. (Ed.), (1996) **An introduction to Vygotsky.** London: Routledge.

Darby, J. (2002) Networked learning in Higher Education: The mule in the barn. In C. Jones & C. Steeples (Eds.), **Networked learning: Perspectives and issues** (pp. 17-26). London: Springer

Davie, L., & Palmer, P. (1984) Computer-teleconferencing for advanced distance education. **Canadian Journal of University Continuing Education, X** (2), 56-66.

Davie, L. E. (1987) Learning through networks: A graduate course using computer conferencing. **Canadian Journal of University Continuing Education, 111**(2), 55-69.

Davie, L. E. (1988) The facilitation of adult learning through computer-mediated distance education. **Journal of Distance Education, 111** (2), 55-69.

Davies, D. G., & Jennings, C. (1992) **The ELNET final report.** CECOMM, Southampton.

Davis, S. (Ed.), (1991) **Pragmatics: A reader.** Oxford: Oxford University Press.

Davis B. & Brewer J. (1997) **Electronic discourse: Linguistic individuals in virtual space.** Albany, USA: State University of New York Press.

Dillenbourg, P. (1999) Introduction: What do you mean by "collaborative learning "? In P. Dillenbourg (Ed.), **Collaborative learning: Cognitive and computational approaches** (pp 1-19) Oxford. Elsevier.

Doise, W., & Mugny, G. (1984) **The social development of the intellect.** Oxford: Pergamon Press.

Donellan, K. S. (1981). Intuitions and presuppositions. In P. Cole (Ed.) **Radical pragmatics** (pp. 129-142) New York. Academic Press.

Donnellan, K. (1991) Reference and definite description. In S. Davis (Ed.), **Pragmatics: A reader** (pp. 52-76). Oxford: Oxford University Press.

Draper, S., & Anderson, A. (1991) The significance of dialogue in learning and observing learning. **Computers and Education, 17** (1), 93-107.

Duranti, A., & Goodwin, C. (1992) **Rethinking context: Language as an interactive phenomenon**. Cambridge: Cambridge University Press.

Edwards, D., & Mercer, N. (1987). **Common knowledge: The development of understanding in the classroom**. London: Methuen/Routledge.

Eistenstad, M., & Vincent, T. (Eds.), (1998) **The knowledge web: Learning and collaborating on the Net**. London: Kogan Page.

Ellis, R. (1994) **The study of second language acquisition**. Oxford: Oxford University Press.

Emms, J., & McConnell, D. (1988) An evaluation of tutorial support provided by electronic mail and computer conferencing. **Aspects of Educational Technology, XXXI.**

Entwhistle, N., & Waterston, S. (1988) Approaches to studying levels of processing in university students. **British Journal of Educational Psychology, 58,** 258-265.

Esa, A., & Lyytinen, K. (1996) On the success of speech acts and negotiating commitments. In F. Dignum, J. Dietz, E. Verharen, & H. Weigand (Eds.), **First International Workshop on Communication Modeling**. Tilburg, The Netherlands: Springer.

Fahy, P. J. (2001) Addressing some common problems in transcript analysis. **International Review of Research in Open and Distance Learning, 11**(2). Available at: http://www.irrodl.org/content/v1.2/research.htm#Fahy (Accessed on 09/12/03)

Fahy, P. J. (2003) Indicators of support in online interaction. **International Review of Research in Open and Distance Learning, 4** (1). Available at: http://www.irrodl.org/content/v4.1/fahy.html (Accessed on 27/03/04)

Feenburg, A. (1987) Computer conferencing and the humanities. **Instructional Science, 16,** 169-186.

Feenburg, A. (1989) The written world: On the theory and practice of computer conferencing. In R. Mason & A. Kaye (Eds.), **Mindweave: Communication, computers and distance education** (pp. 22-39) Oxford: Pergamon Press.

Feenburg, A., & Bellman, B. (1990) Social factor research in computer-mediated communications. In L. Harasim (Ed.), **Online education: Perspectives on a new environment** (pp. 67-97) New York: Praeger.

Ferrara, K., Bruner, H., & Whittemore, G. (1991) Interactive written discourse as an emergent register. **Written Communications, 8** (1), 8-34.

Forman, E. (1989) The role of peer interaction in the social construction of mathematical knowledge. **International Journal of Educational Research, 13,** 152-161.

Fox, S. (2002) Studying networked learning: Some implications from socially situated learning theory and actor network theory. In C. Steeples & C. Jones (Eds.), **Networked learning: Perspectives and issues** (pp. 77-91). London: Springer.

Freire, P. (1972) **Pedagogy of the oppressed.** Middlesex: Penguin Education.

Gains, J. (1999) Electronic mail-a new style of communication or just a new medium? An investigation into the text features of e-mail. **English for Specific Purposes, 18** (1), 81-101.

Ganesan, R., Edmonds, G. S., & Spector, J. M. (2002) The changing nature of instructional design for networked learning. In C. Steeples & C. Jones (Eds.), **Networked learning: Perspectives and issues** (pp. 93-109). London: Springer.

Garrison, D. R. (1992) Critical thinking and self-directed learning in adult education: an analysis of responsibility and control issues. **Adult Education Quarterly, 42** (3), 136-148.

Garrison, D. R., Anderson, T., & Archer, W. (2001) Critical thinking, cognitive presence and computer conferencing in distance education. **American Journal of Distance Education, 15** (1), 7-23.

Garrison, D. R., & Baynton, M. (1987) Beyond independence in distance education: The concept of control. **American Journal of Distance Education, 1** (3), 3-15.

Gaver, W. W. (1992) The affordances of media space for collaboration. In **Sharing Perspectives-Proceedings of the Conference on Computer Supported Cooperative Work**, (pp. 17-24). Toronto:

Gazdar, G. (1979a) **Pragmatics: Implicature, presupposition and logical form.** London: Academic Press.

Gazdar, G. (1979b) A solution to the projection problem. In C.-K. Oh & D. A. Dinneen (Eds.), **Syntax and semantics: Presupposition** (pp. 57-90). London: Academic Press.

Geis, M. (1995) **Speech acts and conversational interaction.** Cambridge: Cambridge University Press.

Goffman, E. (1971) **The presentation of self in everyday life.** London: Pelican.

Goffman, E. (1976) Replies and responses. **Language in Society, 5**, 257-313.

Goffman, E. (1981) **Forms of talk.** Oxford: Blackwell.

Good, D. (1990) Repair and cooperation in conversation. In P. Luff, N. Gilbert, & D. Frohlich (Eds.), **Computers and Conversation** (pp. 133-150). London: Academic Press.

Goodyear, P. (1994) **Telematics, flexible and distance learning in postgraduate education** (CTISS File No. 17).

Goodyear, P. (2002) Psychological foundations for networked learning. In C. Steeples & C. Jones (Eds.), **Networked learning: Perspectives and issues** (pp. 49-75). London: Springer.

Goonasekera, A. (1990) Communication, culture and the growth of the individual self in the third world societies. **Asian Journal of Communication, 1** (1), 34-52.

Graddol, D., & Swann, J. (1989) **Gender voices.** Oxford: Blackwell.

Green, G. M., & Morgan, J. L. (1981) Pragmatics, grammar and discourse. In P. Cole (Ed.), **Radical pragmatics** (pp. 167-181). London: Academic Press.

Grice, H. P. (1957) Meaning. **Philosophical Review, 67**, 377-388.

Grice, H. P. (1968) Utterer's meaning, sentence-meaning and word-meaning. **Foundations of language, 4**, 1-18.

Grice, H. P. (1975) William James lectures: Logic and conversation. In P. Cole & J. L. Morgan (Eds.), **Syntax and semantics** (pp. 41-58). New York: Academic Press.

Grice, H. P. (1978). William James lectures: Further notes on logic and conversation. In P. Cole (Ed.), **Syntax and semantics** (pp. 113-128). New York: Academic Press.

Grice, P. (1981) Presupposition and conversational implicature. In P. Cole (Ed.), **Radical pragmatics** (pp. 183-198). London: Academic Press.

Grint, P. (1989) Accounting for failure: Participation and non-participation. In R. Mason & A. Kaye (Eds.), **Mindweave: Communication, computers and distance education** (pp. 189-191). Oxford: Pergamon Press.

Grundy, P. (1995) **Doing pragmatics** (1st. ed.). London: Arnold.

Grundy, P. (2000) **Doing pragmatics** (2nd. ed.). London: Arnold.

Gunawardena, C., Lowe, C., & Andersen, T. (1997) Analysis of a global debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. **Journal of Educational Computing Research, 17** (4), 395-429.

Habermas, J. (1972) **Knowledge and human interests.** Oxford: Heinemann.

Habermas, J. (1984) **The theory of communicative action: Volume 1-Reason and the rationalisation of society.** London: Heinemann Press.

Habermas, J. (1987). **The theory of communicative action: Volume 2: Lifeworld and system: A critique of functionalist reason.** Cambridge: Polity Press.

Halliday, M. (1967). Notes on transitivity and theme in English. **Journal of Linguistics, 3**, 199-244.

Halliday, M. A. K. (1985a) **An introduction to functional grammar.** London: Edward Arnold.

Halliday, M. A. K. (1985b) **Spoken and written language.** Oxford: Oxford University Press.

Halliday, M. A. K., & Hasan, R. (1976) **Cohesion in English.** New York: Longman.

Halliday, M. A. K., & Hasan, R. (1989) **Language, context and text: Aspects of language in a social semiotic perspective.** Oxford: Oxford University Press.

Hancher, M. (1979) The classification of cooperative illocutionary acts. **Language in Society, 8**, 1-14.

Hara, N., Bonk, C., & Angeli, C. (2000) Content analysis of online discussions in an applied educational psychology course. **Instructional Science, 28**, 115-152.

Hara, N., & Kling, R. (1999) Students' frustrations with a web-based distance education course. **First Monday,** 4(12). Available at: http://www.firstmonday.dk/issues/issue4_12/hara (Accessed on 09/12/03)

Harasim, L. (1986) Computer learning networks: Educational applications of computer conferencing. **Journal of Distance Education, 1** (1), 59-70.

Harasim, L. (1987) Teaching and learning on-line: Issues in computer mediated graduate courses. **Canadian Journal of Educational Communications, 16** (2), 117-135.

Harasim, L. (1989) On-line education: A new domain. In R. Mason & A. Kaye (Eds.), **Mindweave: communication, computers and distance education** (pp. 50-62) Oxford: Pergamon Press.

Harasim, L. (1990) Online education: An environment for collaboration and intellectual amplification. In L. Harasim (Ed.), **Online education: Perspectives on a new environment** (pp. 39-64). New York: Praeger.

Harasim, L. (1991a) Collaborating in cyberspace using computer conferences as a group learning environment. **Interactive Learning Environments, 3** (2), 119-130.

Harasim, L. (1991b) Teaching by computer conferencing. In A. J. Millar (Ed.), **Applications of computer conferencing to teacher education and human resource development,** (pp. 25-33). Ohio State University:

Harasim, L. (Ed.), (1994) **Global networks: Computers and international communications**. Cambridge, Massachusetts: MIT Press.

Harasim, L., Hiltz, S. R., Teles, L., & Turoff, M. (1995) **Learning networks. A fieldguide to teaching and learning online.** Cambridge: Massachusetts: MIT Press.

Harasim, L. M. (Ed.), (1990) **Online education: Perspectives for a new environment.** New York: Praeger.

Hardy, G., Hodgson, V., McConnell, D., & Reynolds, M. *(1991)* ***Computer mediated communication for management training and development: A research report*** CSML.University of Lancaster.

Hardy, V. (1993) Introducing computer-mediated communication into participative management education: The impact on the tutor's role. **ETTI, 29** (4), 325-331.

Harnish, R. (1991) Logical form and implicature. In S. Davis (Ed.), **Pragmatics** (pp. 316-364). Oxford: Oxford University Press.

Hartley, J., Tagg, A., Garber, B., Barry, D., & Fitter, M. (1991) **Computer conferencing for distance learning** (Final report to the Learning Technologies Unit of the Department of Employment). Department of Occupational Psychology, Birkbeck College, University of London.

Hassell, L., & Christensen, M. (1996) Indirect speech acts and their use in three channels of communication. In F. Dignum, J. Dietz, E. Verharen, & H. Weigand (Eds.), **First International Workshop on Communication Modeling.** Tilburg, The Netherlands: Springer.

Heeren, E., & Lewis, R. (1997) Selecting communications media for distributed communities. **Journal of Computer Assisted Learning, 13** (2), 85-98.

Heim, I. (1982) **The semantics of definite and indefinite descriptions.** PhD, Massachusetts, Amherst.

Henri, F. (1988) Distance education and computer-assisted communication. **Prospects, XVIII** (1).

Henri, F. (1992). Computer conferencing and content analysis. In A. R. Kaye (Ed.), **Collaborative learning through computer conferencing: The Najaden papers** (pp. 117-136). Berlin: Springer.

Henri, F., & Rigault, C. R. (1996). Collaborative distance learning and computer conferencing. In T. T. Liao (Ed.), **Advanced educational technology: Research issues and future potential** (pp. 45-76). Berlin: Springer.

Herring, S. (1993) Gender and democracy in computer mediated communication. **Electronic Journal of Communication, 3** (2). Available at: http://www.cios.org/www/ejc/v3n293.htm#herring (Accessed on 09/12/03)

Herring, S. (1996a) Editor's introduction. **Electronic Journal of *Communication, 6(3).*** Available at: http://www.cios.org/www/ejc/v6n396.htm#Introduction (Accessed on 09/12/03)

Herring, S. C. (Ed.), (1996b) **Computer-mediated communication: Linguistic, social and cross-cultural perspectives.** Amsterdam: John Benjamin.

Herring, S. C. (1996c) Two variants of an electronic message schema. In S. C. Herring (Ed.), **Computer-mediated communication: linguistic, social and cross-cultural perspectives** (pp. 81-106) Amsterdam: John Benjamin.

Herring, S. C. (1999) Interactional coherence in CMC. **Journal of Computer Mediated Communication,** 4(4). Available at: http://www.ascusc.org/jcmc/vol4/issue4/herring.html (Accessed on 09/12/03)

Hiltz, S. R. (1984) **Online communities: A case study of the office of the future.** Norwood, NJ: Ablex.

Hiltz, S. R. (1986) The virtual classroom: Using computer mediated communication for university teaching. **Journal of Communication, 36** (2), 95-104.

Hiltz, S. R. (1990) Evaluating the Virtual Classroom. In L. Harasim (Ed.), **Online education: Perspectives on a new environment** (pp. 133-183). New York: Praeger.

Hiltz, S. R. (1993) **The virtual classroom: Learning without limit via computer networks.** Norwood: Ablex.

Hiltz, S. R., Johnson, K., & Agle, G. M. (1978) **Replicating Bales' problem solving experiments on a computerized conference: A pilot study.** Computerized Conferencing and Communications Center, New Jersey Institute of Technology.

Hiltz, S. R., Johnson, K., Arnovitch, C., & Turoff, M. (1980) **Face-to-face vs. computerized conferences: A controlled experiment** (No. 12). New Jersey Institute of Technology.

Hiltz, S. R., Johnson, K., & Turoff, M. (1986) Experiments in group decision making: Communication process and outcome in face-to-face versus computerized conferences. **Human Communications Research, 13** (2), 225-252.

Hiltz, S. R., & Turoff, M. (1985) Structuring computer-mediated communication systems to avoid information overload. **Communications of the ACM, 28** (7), 680-689.

Hiltz, S. R., & Turoff, M. (1993) **The network nation: Human communication via computers.** Cambridge. Mass: MIT Press.

Hirschberg, J. (1985) **A theory of scalar implicature** (Technical Report No. MS-CIS-85-86). Moore School of Electrical Engineering, University of Pennsylvania.

Hobbs, J. (1987) Implicature and definite reference. In CSLI Report (pp. 87-99). Stanford, CA:

Hodgson, V. (2002) Issues for democracy and social identity in computer mediated communication and networked learning. In C. Steeples & C. Jones (Eds.), **Networked learning: Perspectives and issues** (pp. 229-242). London: Springer.

Holmberg, B. (1988) Guided didactic conversation. In D. Sewart, D. Keegan, & B. Holmberg (Eds.), **Distance education: International perspectives** (pp. 114-122). London: Routledge.

Horn, L. R. (1978) Remarks on neg-raising. In P. Cole (Ed.), **Syntax and semantics: Pragmatics** (pp. 129-220). New York: Academic Press.

Horn, L. R. (1984) Towards a new taxonomy for pragmatic inference: Q- and R-based implicature. In D. Shiffrin (Ed.), **Meaning, form and use in context** (pp. 11-42). Washington: Georgetown University Press.

Horn, L. R. (1985) Metalinguistic negation and pragmatic ambiguity. **Language, 61,** 121-174.

Horn, L. R. (1989) **A natural history of negation**. Chicago: University of Chicago Press.

Horn, L. R. (1996) Presupposition and implicature. In S. Lappin (Ed.), **Handbook of contemporary semantic theory.** Oxford: Blackwell.

Howell-Richardson, C. (1995) Interaction across computer-conferencing. In R. Howard & I. McGrath (Eds.), **Distance education for language teachers** (pp. 118-132). Clevedon, Avon: Multilingual Matters Ltd.

Howell-Richardson, C. (1996) Real-time conversation on the Internet? In G. Motterham, G. Walsh, & R. West (Eds.), **Distance education for language teachers: 2nd symposium** Manchester: School of Education, University of Manchester.

Howell-Richardson, C., & Mellar, H. (1996) A methodology for the analysis of patterns of participation within computer mediated communication courses. **Instructional Science, 24**(1), 47-69.

Hsu, E., & Hiltz, S. R. (1994) Management gaming in a virtual laboratory. In S. R. Hiltz **The virtual classroom: Learning without limits via computer networks** (pp. 217-238). Norwood, New Jersey: Ablex.

Hymes, D. (1974) **Foundations in sociolinguistics**. Philadelphia: University of Philadelphia Press.

Hymes, D. H. (1962) The ethnography of speaking. In T. Gladwin & W. C. Sturtevant (Eds.), **Anthropology and human behaviour** (pp. 13-53). Washington, DC: Anthropological Society of Washington.

Illich, I. D. (1971) **Deschooling society**. London: Calder and Boyars.

Jacobson, R. (1994) Sailing through cyberspace: Counting the stars. In L. Harasim (Ed.), **Global networks: Computers and international communication** (pp. 327-341). Cambridge, Mass: MIT Press.

Jakobson, R. (1939) Signe zero. In **Melanges de linguistique, offerts a Charles Bally** (pp. 143-152). Geneva: Georg.

Johansen, R., Vallee, J., & Spangler, K. (1979) **Electronic meetings: Technical alternatives and social choices**. Reading. MA: Addison-Wesley.

Johnsen-Lenz, P., & Johnsen-Lenz, T. (1981) Consider the groupware: Design and group process impacts on communication in the electronic medium. In S. R. Hiltz & E. B. Kerr (Eds.), **Studies of computer-mediated communications systems: A synthesis of findings.** Newark, NJ:

Johnson, D. W., & Johnson, R. T. (1989) **Cooperation and competition: Theory and research**. Edina: Interaction Book Co.

Johnson, D. W., & Johnson, R. T. (1994) **Learning together and alone: Co-operative, competitive and individualistic learning** (4th. ed.) Boston: Allyn and Bacon.

Johnson-Laird, P. (1983) **Mental models: Towards a cognitive science of language, inference and consciousness.** Cambridge: Cambridge University Press.

Jones, C., & Asensio, M. (2002) Designs for networked learning in higher education: A phenomenographic investigation of practitioners' accounts of design. In C. Steeples & C. Jones (Eds.), **Networked learning: Perspectives and issues** (pp. 253-278). London: Springer.

Jones, S.G. (Ed.), (1999) **Doing Internet research: Intricacies and issues.** Thousand Oaks, CA and London: Sage.

Jones, S. G. (Ed.), (1995) **Cybersociety: Computer-mediated communication and community.** Thousand Oaks. California: Sage.

Karttunen, L., & Peters, S. (1979) Conversational implicature. In C.-K. Oh & D. A. Dinneen (Eds.), **Syntax and semantics: Presupposition** (pp. 1-56). London: Academic Press.

Kaye, A. (1989) Computer-mediated communication and distance education. In R. Mason & A. Kaye (Eds.), **Mindweave: Communication, computers and distance education** (pp 3-21) Oxford: Pergamon Press.

Kaye, A. R. (Ed.), (1992a) **Collaborative learning through computer conferencing: The Najaden papers.** Berlin: Springer.

Kaye, A. R. (1992b) Learning together apart. In A. R. Kaye (Ed.), **Collaborative learning through computer conferencing: The Najaden papers** (pp. 1-24). Berlin: Springer

Keegan, D. (1988a) On defining distance education. In D. Sewart, D. Keegan, & B. Holmberg (Eds.), **Distance education: International perspectives** (pp. 6-33). London: Routledge.

Keegan, D. (1988b) Theories of distance education. In D. Sewart, D. Keegan, & B. Holmberg (Eds.), **Distance education: International perspectives** (pp. 63-67). London: Routledge.

Kenny, A. J. (1966) Practical inference. **Analysis, 26**, 65-75.

Kerr, E. (1986) Electronic leadership: A guide to moderating online conferences. **IEEE *Transactions on Professional* Communications, 29** (1), 12-18.

Kerr, E., & Hiltz, S. R. (1982) **Computer-mediated communication systems: Status and evaluation.** New York: Academic Press.

Kiesler, S. (1992) Talking, teaching and learning in network groups: Lessons from research. In A. R. Kaye (Ed.), **Collaborative learning through computer conferencing: The Najaden papers** (pp. 147-166). Berlin: Springer.

Kiesler, S., Dubrow, D., Moses, A. M., & Geller, V. (1985) Affect in computer-mediated communication. An experiment in synchronous terminal-to-terminal discussion. **Human Computer Interaction, 1** (1), 77-104.

Kiesler, S., Siegel, J., & McGuire, T. (1984) Social psychological aspects of computer-mediated communication. **American Psychologist, 39** (10), 1123-1134.

Kiparsky, P., & Kiparsky, C. (1971) "Fact". In D.D. Steinberg & L. A. Jakobovits (Eds.), **Semantics** (pp. 345-369) Cambridge: Cambridge University Press.

Kneser, C, Pilkington, R, & Treasure-Jones, T. (2001) The tutor's role: An investigation of the power of exchange structure analysis to identify different roles in CMC seminars. **International Journal of Artificial Intelligence in Education (Part II of the special issue on analysing educational dialogue interaction),** 12, 63-84.

Kripke, S. (1979) Speaker's reference and semantic reference. In P. A. French et al (Eds.), **Contemporary perspectives in philosophy of language.** (pp. 6-27). Minneapolis: University of Minnesota Press.

Kruger, A. (1993) Peer collaboration: conflict, cooperation or both? **Social Development, 2** (3), 161-183.

Lakoff, G. (1987) **Women, fire and dangerous things.** Chicago: University of Chicago Press.

Lakoff, G., & Johnson, M. (1980) **Metaphors we live by.** Chicago: University of Chicago Press.

Landow, G. P. (1992) **The convergence of contemporary critical theory and technology.** Baltimore: John Hopkins University Press.

Landow, G. P., & Delany, P. (1993) **The digital word: Text-based computing in the humanities.** Cambridge. Mass: MIT Press.

Laurillard, D. (1993) **Rethinking university teaching: A framework for the effective use of educational technology** (1st. ed.). London: Routledge.

Laurillard, D. (2002) **Rethinking university teaching: A conversational framework for the effective use of educational technologies** (2nd. ed.). London: Routledge.

Lave, J., & Wenger, E. (1991) **Situated learning: Legitimate peripheral participation.** Cambridge: Cambridge University Press.

Lea, M. (1992) **Contexts of computer-mediated communication.** Hemel Hempstead: Harvester-Wheatsheaf.

Lea, M., & Nicoll, K. (Eds.), (2002) **Distributed learning. Social and cultural approaches to practice.** London: Routledge.

Lea, M., O'Shea, T., Fung, P., & Spears, L. (1992) 'Flaming' in computer-mediated communication: Observations, explanations, implications. In M. Lea (Ed.), **Contexts of computer-mediated communication** (pp. 89-112). Hemel Hempstead: Harvester-Wheatsheaf.

Leech, G. N. (1983) **Principles of pragmatics.** New York: Longman.

Levin, J., Waugh, M., Brown, D., & Clift, R. (1994) Teaching teleapprenticeships: A new organisational framework for improving teacher education using electronic networks. **Machine-Mediated Learning, 4** (2+3), 149-162.

Levin, J. A., Kim, H., & Riel, M. M. (1990) Analysing instructional interactions on electronic message networks. In L. M. Harasim (Ed.), **Online education: Perspectives on a new environment** (pp. 185-213) New York: Praeger.

Levinson, S. (1979) Activity types and language. **Linguistics, 17,** 365-399.

Levinson, S. (1983) **Pragmatics.** Cambridge: Cambridge University Press.

Levinson, S. (1989) Relevance. **Journal of Linguistics, 25,** 455-472.

Levinson, S. C. (1981) The essential inadequacies of Speech Act models of dialogue. In H. Parret, M. Sbis'a, & J. Verschueren (Ed.), **Possibilities and limitations of pragmatics**. Amsterdam: John Benjamin.

Levinson, S. C. (1987) Pragmatics and the grammar of anaphora. **Journal of Linguistics, 23**, 379-434.

Levinson, S. C. (1988) Putting linguistics on a proper footing: Explorations in Goffman's concepts of participation. In P. Drew & A. Wootton (Eds.), **Erving Goffman: Exploring the interaction order** (pp. 161-227). Cambridge: Polity Press.

Levinson, S. C. (1992) Activity types and language. In P. Drew & J. Heritage (Eds.), **Talk at work** (pp. 66-100) Cambridge: Cambridge University Press.

Levinson, S. C. (2000) **Presumptive meanings: The theory of generalized conversational implicature**. Cambridge, Massachusetts: MIT Press.

Lewis, D. (1969) **Convention: A philosophical study**. Cambridge, Mass: Harvard University Press.

Lewis, D. (1979) Score-keeping in a language game. In R. Bauerle, U. Egli, & A. v. Stechow (Eds.), **Semantics from different points of view** (pp. 172-187) Berlin: Springer.

Liao, T. (Ed.), (1996) **Advanced educational technology: Research issues and future potential**. Berlin Springer.

Light, P., Colbourn, C., & Light, V. (1997) Computer mediated tutorial support for conventional university courses. **Journal of Computer Assisted Learning, 13** (4), 228-235.

Love, R. E., & Love, G. (1987) Electronic emotion: Socio-emotional content in a computer-mediated communication network. **Communication Research, 14** (1), 131-152.

Lyons, J. (1995) **Linguistic semantics: An introduction.** Cambridge: Cambridge University Press.

Mackinnon, C. R. (1995) Searching for the Leviathan in Usenet. In S. G. Jones (Ed.), **Cybersociety: Computer-mediated communication and community** (pp. 112-137). Thousand Oaks, California: Sage.

Magee, B. (1974) **Popper** (3rd. ed.). London: Collins Sons and Co Ltd.

Malinowski, B. (1923) The problem of meaning in primitive languages. In C. K. Ogden & I. A. Richards (Eds.), **The meaning of meaning** London: Kogan-Paul.

Mann, C., & Stewart, F. (2000) **Internet communication and qualitative research.** London, Sage.

Martin, J. R. (1989) **Factual writing: exploring and challenging social reality** (2nd. ed.). Oxford: Oxford University Press.

Marton, F. (1981) Phenomenography-describing conceptions of the world around us. **Instructional Science, 10,** 177-200.

Marton, F., & Booth, S. (1997) **Learning and awareness.** Mahwah: New Jersey: Lawrence Erlbaum Associates.

Marton, F., & Saljo, R. (1976a) On qualitative differences in learning I: Outcome and process. **British Journal of Educational Psychology, 46,** 4-11.

Marton, F., & Saljo, R. (1976b) On qualitative differences in learning II: Outcome as a function of the learner's conception of the task. **British Journal of Educational Psychology, 46**, 115-127.

Mason, R. (1989) An evaluation of Cosy on an Open University course. In R. Mason & A. Kaye (Eds.), **Mindweave: Communication, computers and distance education** (pp. 115-145). Oxford: Pergamon Press.

Mason, R. (1992a) Evaluation methodologies for computer conferencing applications. In A. R. Kaye (Ed.), **Collaborative learning through computer conferencing: The Najaden papers** (pp. 105-116). Berlin: Springer.

Mason, R. (1992b) Written interactions. In R. Mason (Ed.), **Computer conferencing: The last word** (pp. 3-20). Victoria, BC: Beach Holme.

Mason, R. (Ed.), (1993) **Computer conferencing: the last word.** Victoria: British Columbia: Beach Holme.

Mason, R. (Ed.), (1994) **Using communications media in open and flexible learning.** London: Kogan Page.

Mason, R., & Kaye, A. (Ed.), (1989) **Mindweave: computers, communication and distance education.** London: Pergamon Press.

Mason, R., & Kaye, T. (1990) Toward a new paradigm for distance education. In L. M. Harasim (Ed.), **Online education: Perspectives on a new environment** (pp. 15-38). New York: Praeger.

Mayers, D. (1995) **Computer conferencing in higher education teaching: A discussion and case study.** MA dissertation, Institute of Education, University of London.

Mayes, T., Dineen, F., McKendree, J., & Lee, J. (2002) Learning from others learn. In C. Steeples & C. Jones (Eds.), **Networked learning: Perspectives and issues** (pp. 213-227). London: Springer.

McAteer, E., Tolmie, A., Crook, C., Macleod, H., & Musselbrook, K. (2002) Learning networks and the issue of communication skills. In C. Steeples & C. Jones (Eds.), **Networked learning: Perspectives and issues** (pp. 309-322). London: Springer.

McConnell, D. (1992) Computer mediated communication in management learning. In A. R. Kaye (Ed.), **Collaborative learning through computer conferencing: The Najaden papers** (pp. 51-68). Berlin: Springer.

McConnell, D. (2000) **Implementing computer supported co-operative learning** (2nd. ed.). London: Kogan Page.

McCreary, E. (1990) Three behaviourial models for computer-mediated communication. In L. M. Harasim (Ed.), **Online education: Perspectives on a new environment** (pp. 117-130). New York: Praeger.

McGuire, T. W., Kiesler, S., & Siegel, J. (1987) Group and computer-mediated discussion effects in risk decision-making. **Journal of Personality and Social Psychology, 52**, 917-930.

McLaughlin, M. L., Osborne, K. K., & Smith, C. B. (1995) Standards of conduct on Usenet. In S. G. Jones (Ed.), **Cybersociety: Computer-mediated communication and community** (pp. 90-111) Thousand Oaks, California: Sage.

Mecantz, B., & England, R. (1993) Can CMC teach teachers training? **EMI, 30** (2), 74-77.

Mercer, N. (1994) The quality of talk in children's joint activity at the computer. **Journal of Computer Assisted Learning, 10**, 24-32.

Mercer, N. (1995) **The guided construction of knowledge.** Clevedon: Multilingual Matters.

Mercer, N. (2000) **Words and minds.** London: Routledge.

Metz, M. (1994) Computer-mediated communication: Literature review of a new context. **International Computing and Technology, 2** (2), 31-49.

Miles, M. B., & Huberman, A. M. (1994) **Qualitative data analysis.** Thousand Oaks. California: Sage.

Miyake, N. (1986) Constructive interaction and the iterative process of understanding. **Cognitive Science, 10**, 151-177.

Moeschler, J. (1985) **Argumentation et conversation: elements pour an analyse pragmatique du discours.** Paris: Hatier.

Moore, M. G., & Kearsley, G. (1996) **Distance education-a systems view.** London:

Morgan, J. L. (1991) Two types of convention in indirect speech acts. In S. Davis (Ed.), **Pragmatics: A reader** (pp. 242-253). Oxford: Oxford University Press.

Newlands, A., Anderson, A. H., & Mullin, J. (1996) Dialogue structure and cooperative task performance in two CSCW environments. In J. H. Connolly & L. Pemberton (Eds.), **Linguistic concepts and methods in CSCW** (pp. 41-60). London: Springer.

Newman R, W. B., Johnson C and Cochrane C (1995) A content analysis method to measure critical thinking in face-to-face and computer supported group learning. **Interpersonal Computing and Technology, 2**, 56-77.

Nunberg, G. (1981) Validating pragmatic explanations. In P. Cole (Ed.), **Radical pragmatics** (pp. 199-222). London: Academic Press.

O'Malley, C. (Ed.), (1994) **Computer supported collaborative learning.** Berlin Springer.

Oh, C.-K., & Dinneen, D. A. (Ed.), (1979) **Syntax and semantics: Presupposition.** London: Academic Press.

Okamura, K., Fujimoto, M., Orlikowski, W. J., & Yates, J. (1995) Helping CSCW applications succeed: the role of mediators in the context of use. **The Information Society, 11** (3), 157-172.

Owen, T. (1992) Wired writing: the writers in electronic residence program. In R. Mason (Ed.), **Computer conferencing: The last word** (pp. 125-147). Victoria, BC.: Beach Holme.

Paccagnella, L. (1997) Getting the seat of your pants dirty: strategies for ethnographic research on virtual communities. **Journal of Computer-Mediated-Communication, 3**(1). Available at: http://www.ascusc.org/jcmc/vol3/issue1/paccagnella.html (Accessed on 09/12/03)

Pask, G. (1976a) Styles and strategies of learning. **British Journal of Educational Psychology, 46,** 128-148.

Pask, G. (1976b) Conversational techniques in the study and practice of education. **British Journal of Educational Psychology, 46** 12-25.

Paulsen, M. F. (1995) The online report on pedagogical techniques for computer-mediated communication. Available at: http://www.nettskolen.com/pub/artikkel.xsql?artid=123 (Accessed on 09/12/03)

Pemberton, L. (1996) Telltales and overhearers: participant roles in electronic mail communication. In J. H. Connolly & L. Pemberton (Eds.), **Linguistic concepts and methods in CSCW** London: Springer.

Peters, O. (1988) Distance teaching and industrial production: A comparative interpretation in outline. In D. Sewart, D. Keegan, & B. Holmberg (Eds.), **Distance education: International perspectives** (pp. 95-111) London: Routledge.

Pilkington, R.M, & Walker, S.A. (2003) Facilitating debate in networked learning: Reflecting on online synchronous discussion in higher education. **Instructional Science (special issue on advances in research on networked learning), 31** (1-2), 41-63.

Pilkington, R.M. (1999) **Analysing educational discourse: The DISCOUNT scheme** (Technical report No. 99/2). Computer Based Learning Unit, University of Leeds.

Pilkington, R. M. (1998) Dialogues in support of qualitative reasoning. **Journal of Computer Assisted Learning: Special issue on qualitative reasoning, 14**, 308-320.

Pincas, A. (1995a) Analysis of face to face and computer conferencing interactions in university teaching. In C. O'Hagen (Eds.), **Empowering learners and teachers through technology** SEDA.

Pincas, A. (1995b) Views of learning based on the experience of running computer conferencing courses. In C. O'Hagen (Ed.), **Empowering learners and teachers through technology.** SEDA.

Poster, M. (1990) **The mode of information**. Cambridge: Polity Press.

Potter, D., & Mercer, N. (1989) **Common knowledge**. London: Routledge.

Potter, J., & Wetherall, M. (1994) **Discourse analysis and social psychology**. London: Sage.

Preece, J. (2000) **Online communities: Designing usability, supporting sociability.** Chichester: John Wiley & sons.

Ramsden, P. (1992) **Learning to teach in higher education**. London: Routledge.

Rapaport, M. (1991) **Computer mediated communications: Bulletin boards, computer conferencing, electronic mail and information retrieval**. New York: John Wiley & Sons.

Recanti, F. (1991) The pragmatics of what is said. In S. Davis (Ed.), **Pragmatics: A reader** (pp. 97-120). Oxford: Oxford University Press.

Rekkedal, T., & Paulsen, M. F. (1989) Computer conferencing in distance education: Status and trends. **European Journal of Education, 24** (1), 61-72.

Rheingold, H. (1994) A slice of life in my virtual community. In L. Harasim (Ed.), **Global networks: Computers and international communication** (pp. 57-80). Cambridge, MA: MIT Press.

Rice, R. E. (1982) Communication networking in computer-conferencing systems: A longitudinal study of group roles and system structure. In M. Burgoon (Ed.), **Communication Yearbook 6** (pp. 925-944). Beverly Hills, California: Sage.

Rice, R. E. (1993) Media appropriateness: Using social presence theory to compare traditional and new organizational media. **Human Communication Research, 19,** 451-484.

Rice, R. E., & Associates (1984) ***The new media: Communication, research and technology.*** Beverly Hills: Sage.

Rice, R. E., & Love, G. (1987) Electronic emotion: Socio-emotional content in a computer-mediated communication network. **Journal of Communications, 33** (1), 131-152.

Riel, M. (1990) Cooperative learning across classrooms in electronic learning circles. **Instructional Science, 19** (6), 445-466.

Rinaldi, A. (1996) The ten commandments for computer ethics in the Net: User guidelines and netiquette. Available at: http://www.desoto.k12.la.us/ten.htm (Accessed on 09/12/03)

Rogers, C. (1969) **Freedom to learn.** Columbus, Ohio: Charles E Merrill.

Rosch, E. (1978) Principles of categorisation. In E. Rosch & B. Lloyd (Eds.), **Cognition and categorisation** (pp. Chapter 2). Lawrence Erlbaum.

Rourke, L., Andersen, T., Garrison, R., & Archer, W. (1999) Assessing social presence in asynchronous text-based computer-conferencing. **Journal of Distance Education, 14** (2), 50-71.

Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001) Methodological issues in the content analysis of computer conference transcripts. **International Journal of Artificial Intelligence** (12), 8-22.

Rousseau, J. J. (1963). **Emile** (B. Foxley, Trans.). London: Dent.

Rowntree, D. (1987) **Assessing students: How *shall we know them*?** London: Kogan Page.

Rowntree, D. (1990) **Teaching through self-instruction.** London: Kogan Page.

Rueda, J. (1992) Collaborative learning in a large scale computer conferencing system. In A. Kaye (Ed.), **Collaborative learning through computer conferencing: the Najaden papers** (pp 87-101) Berlin: Springer.

Rumelhart, D., McClelland, J., & the PDP research group (1989) **Parallel distributed computing**. Cambridge, Mass: MIT Press.

Russell, B. (1905). On denoting. **Mind, 14,** 479-493.

Sacks, H. (edited posthumously by G. Jefferson) (1992a) **Lectures on conversation.** Oxford: Blackwell.

Sacks, H. (edited posthumously by G. Jefferson) (1992b) **Lectures on conversation.** Oxford: Blackwell.

Sacks, H., Schlegoff, E., & Jefferson, G. (1974) A simplest systematics for the organisation of turn-taking for conversation. **Language, 50** (4), 696-735.

Sadock, J. M. (1974) **Towards a linguistic theory of speech acts.** New York: Academic Press.

Sadock, J. M. (1978) On testing for conversational implicature. In P. Cole (Ed.), **Syntax and semantics: Pragmatics** (pp. 281-297). New York: Academic Press.

Sadock, J. M. (1981) Almost. In P. Cole (Ed.), **Radical pragmatics** (pp. 257-271). London: Academic Press.

Sadock, J. M. (1986) Remarks on the paper by Deidre Wilson and Dan Sperber. In A. M. Farley, P. T. Farley, & K.-E. McCullough (Eds.), **Para-session on pragmatics and grammatical theory at Chicago Linguistics Society :22,** 2 (pp. 85-90). Chicago:

Salmon, G. (2000) **E-moderating. The key to teaching and learning online.** London: Kogan Page.

Salmon, G. (2002a) **E-tivities: The key to active online learning.** London: Kogan Page.

Salmon, G. (2002b) Approaches to researching teaching and learning online. In C. Steeples & C. Jones (Eds.), **Networked learning: Perspectives and issues** (pp. 195-212). London: Springer.

Schegloff, E. A. (1987) Some sources of misunderstanding in talk-in-interaction. **Linguistics, 25,** 201-218.

Schegloff, E. A. (1988) Presequences and indirection: Applying Speech Act theory to ordinary conversation. **Journal of Pragmatics, 12,** 55-62.

Schegloff, E. A. (1992) In another context. In A. Duranti & C. Goodwin (Eds.), **Rethinking context** (pp. 191-228) Cambridge: Cambridge University Press.

Schiffer, S. (1972) **Meaning.** Oxford: Clarendon Press.

Schrage, M. (1993) **Shared minds: The new technologies of collaboration.** New York: Random House.

Schrum, L. (1991) Teacher education goes online. **Educational Leadership, 49** (3), 41-42.

Searle, J. (1975) Indirect speech acts. In P. Cole & J. Morgan (Eds.), **Syntax and semantics** (pp. 59-82). New York: Academic Press.

Searle, J. R. (1969) **Speech acts.** Cambridge: Cambridge University Press.

Searle, J. R. (1976) The classification of illocutionary acts. **Language in Society, 5**, 1-24.

Searle, J. R. (1979) Referential and attributive. **Monist, 62**, 190-133.

Searle, J. R., Kiefer, F., & Biermisch, M. (1980) **Speech act theory and pragmatics.** Dordecht: Netherlands: D. Reidel Publishing Co.

Self, J. A. (1995) DORMOBILE: A vehicle for metacognition. In T. W. Chan & J. A. Self (Eds.), **Emerging computer technologies in education** Charlottesville: AACE.

Seliger, H. W., & Shohamy, E. (1989) **Second language research methods.** Oxford: Oxford University Press.

Sewart, D., Keegan, D., & Holmberg, B. (Eds.), (1988) **Distance education: International perspectives.** London: Croom Helm/St. Martin's Press.

Sharan, S., Kussell, P., Hertz-Lazarowitz, R., Bejarano, Y., Raviv, S., & Sharan, Y. (1984) **Cooperative learning in the classroom; Research in desegregated schools.** Hillsdale, N.J.: Erlbaum.

Sharan, S., & Shachar, H. (1988) **Language and learning in the cooperative classroom.** New York: Springer

Sharan, Y., & Sharan, S. (1992) **Expanding cooperative learning through group investigation.** New York: Teachers College Press.

Short, J., Williams, E., & Christie, B. (1976) **The social psychology of telecommunications.** London: John Wiley and sons.

Siegel, J., Dubrovsky, V., Kiesler, S., & McGuire, T. (1986) Group processes in computer-mediated communication. **Organizational Behaviour and Human Decision Processes, 37,** 157-187.

Sinclair, J., & Coulthard, M. (1975) **Towards an analysis of discourse: The English used by teachers and pupils.** Oxford: Oxford University Press.

Sinclair, J., & Coulthard, M. (1992) Towards an analysis of discourse. In M. Coulthard (Ed.), **Advances in spoken discourse analysis** (pp. 1-34). London: Routledge.

Slavin, R. E. (1995a) **Cooperative learning. Theory, research and practice** (2nd. ed.). Needham Heights, Massachusetts: Allyn and Bacon.

Slavin, R. E. (1995b) Research on cooperative learning and achievement: What we know, what we need to know. Available at: http://www.successforall.net/resource/research/cooplearn.htm (Accessed on 09/12/03)

Smolensky, M., Carmody, M., & Halcomb, C. (1990) The influence of task type, group structure and extroversion on uninhibited speech in computer-mediated communications. **Computers in Human Behaviour, 6,** 261-272.

Sorensen, E. (1992) **Learning online through linguistic interaction: an evaluation of two online courses.** COSTEL project. COMMETT II programme.

Sorensen, E., & Kaye, T. (1992) Online course design. In **Telecommunications in education and organization**. Danish Technological Institute, Aarhuus.

Spafford, G. (1993) Rules for posting to Usenet. Available at: http://www.faqs.org/faqs/usenet/posting-rules/part1 (Accessed on 09/12/03)

Spears, R., & Lea, M. (1992) Social influence in CMC. In M. Lea (Ed.), **Contexts of computer-mediated communication** (pp. 30-65). London: Harvester-Wheatsheaf.

Sperber, D., & Wilson, D. (1986) **Relevance: Communication and cognition**. Oxford: Blackwell.

Sperber, D., & Wilson, D. (1995) **Relevance** (2nd. ed.). Oxford: Blackwell.

Spitzer, M. (1986) Writing style in computer conferences. **IEEE Transactions on Professional Communications, 29** (1), 19-22.

Sproull, L., & Kiesler, S. (1986) Reducing social context cues; electronic mail in organisational communication. **Management Science, 32**, 1492-1512.

Sproull, L., & Kiesler, S. (1991) **Connections: New ways of working in the networked organisation**. Cambridge, MA: MIT Press.

Steeples, C., Goodyear, P., & Mellar, H. (1994) Flexible learning in higher education: The use of computer-mediated communications. **Computers in Education, 22** (1/2), 83-90.

Steeples, C., & Jones, C. (Eds.) (2002) **Networked learning: Perspectives and issues.** London: Springer.

Steeples, C., Jones, C., & Goodyear, P. (2002) Beyond e-learning: A future for networked learning. In C. Steeples & C. Jones (Eds.), **Networked learning: Perspectives and issues** (pp. 323-341). London: Springer.

Strawson, P. F. (1950). On referring. **Mind, 59**, 320-344.

Strawson, P. F. (1991) Intention and convention in speech acts. In S. Davis (Ed.), **Pragmatics: A reader** (pp. 290-301). Oxford: Oxford University Press.

Stubbs, M. (1983) **Discourse analysis: The sociolinguistic analysis of natural language**. Oxford: Blackwell.

Swales, J. M. (1990). **Genre analysis: English in academic and research settings.** Cambridge: Cambridge University Press.

Tagg, A. C., & Dickinson, J. A. (1995) Tutor messaging and its effectiveness in encouraging student participation on computer conferences. **Journal of Distance Education, 10** (2), 33-55.

Tannen, D. (1982a) Oral and literate strategies in spoken and written narratives. **Language, 58**, 1-21.

Tannen, D. (1982b) The oral/literate continuum in discourse. In D. Tannen (Ed.), **Spoken and Written Language** (pp. 1-16). Norwood, N.J: Ablex.

Teasley, S. D., & Roschelle, J. (1993) Constructing a joint problem space: The computer as a tool for sharing knowledge. In S. Lajoie & S. Derry (Eds.), **Computers as cognitive tools** (pp. 229-258) Hillsdale, N.J.: Lawrence Erlbaum Associates.

Thomas, J. (1995) **Meaning in interaction: An introduction to pragmatics.** London: Longman.

Thomason, R. H. (1990) Accommodation, meaning and implicature: Interdisciplinary foundations for pragmatics. In P. R. Cohen, J. Morgan, & M. E. Pollack (Eds.), **Intentions in communication** (pp. 325-364) Cambridge MA: MIT Press.

Thorpe, M. (1989) **The tutor perspective on computer-mediated communication in DT200: Introduction to information technology** (CITE Report No. 76). Institute of Educational Technology, Open University.

Thorpe, M. (1993) **Evaluating open and distance learning** (2nd. ed.). Harlow: Longman.

Tolmie, A., & Boyle, J. (2000) Factors influencing the success of computer-mediated-communication (cmc) in university environments: A review and case-study. **Computers and Education, 34,** 119-140.

Trehan, K., & Reynolds, M. (2002) Online collaborative assessment: Power relations and 'critical learning'. In C. Steeples & C. Jones (Eds.), **Networked learning: Perspectives and issues** (pp. 279-292). London: Springer.

Trentin, G. (1997) Telematics and on-line teacher training: The POLARIS project. **Journal of Computer Assisted Learning, 13** (4), 261-270.

Valee, J. (1984) **Computer message systems.** New York: McGraw Hill.

Valee, J., Johansen, R., Randolph, R., & Hastings, A. (1974) **Group communication through computers: A study of social effects** Vol. 2, Institute for the Future, Menlo Park.

van Dijk, T. A. (1980) **Text and context: Explorations in the semantics and pragmatics of discourse.** London: Longman.

van Dijk, T. A. (1985) **Handbook of discourse analysis.** London: Academic Press.

van Dijk, T. A. (Ed.), (1997) **Discourse as social interaction.** London: Sage.

van Lehn, K, Bull, W & Kowalski, B (1990) Explanation-based learning of correctness: Towards a model of the self-explanation effect. Paper presented at the twelfth annual conference of the Cognitive Science Society.

Vygotsky, L. (1986) **Thought and language** (A. Kozulin, Trans.) Cambridge, Mass: MIT Press.

Vygotsky, L. S. (1978) **Mind in society: The development of higher psychological processes.** Cambridge,MA: Harvard University Press.

Waggoner, M. (1992) A case study approach to evaluation of computer conferencing. In A. R. Kaye (Ed.), **Collaborative learning through computer conferencing: The Najaden papers** (pp. 137-146) Berlin: Springer.

Walton, D. N. (1984) **Logical dialogue games and fallacies.** Lanham: University Press of America.

Wegerif, R. (1996) Collaborative learning and directive software. **Journal of Computer Assisted Learning, 12,** 22-32.

Wegerif, R., & Mercer, N. (1997) Using computer-based text analysis to integrate qualitative and quantitative methods in research on collaborative learning. **Language and Education, 11** (4), 271-286.

Wells, R. (1992) **Computer-mediated communication for distance education: An international review of design, teaching and institutional issues** Monograph 6. American Center for the Study of Distance Education, Pennsylvania State University.

Werry, C (1996). Linguistic and interactional features of Internet relay-chat. In S. C. Herring (Ed.), **Computer-mediated communication: linguistic, social and cross-cultural perspectives** (pp. 47-63) Amsterdam: John Benjamin.

Wertsch, J. V. (1991) A sociocultural approach to socially shared cognition. In L. Resnick, J. Levine, & S. Teasley (Eds.), **Perspectives on socially shared cognition** Washington, DC: American Psychological Association.

Widdowson, H. G. (1983) **Learning purpose and language use.** Oxford: Oxford University Press.

Widdowson, H. G. (1984) **Explorations in applied linguistics.** Oxford: Oxford University Press.

Widdowson, H. G. (1990) **Aspects of language teaching.** Oxford: Oxford University Press.

Wilkins, H. (1991) Computer talk: Long distance conversation by computer. **Written Communications, 8** (1), 56-78.

Wilson, D., & Sperber, D. (1979) Ordered entailments: An alternative to presuppositional theories. In C.-K. Oh & D. A. Dinneen (Eds.), **Syntax and semantics: Presupposition** (pp. 299-324) London: Academic Press.

Winograd, T., & Flores, F. (1987) **Understanding computers and cognition: A new foundation for design.** Norwood: Ablex.

Witttgenstein, L (1972) Preliminary studies for the 'Philosophical Investigations': The Blue and Brown books. Oxford. Blackwell.

Wood, D., Bruner, J. S., & Ross, G. (1976) The role of tutoring in problem solving. **Journal of Child Psychology and Child Psychiatry, 17**, 89-100.

Yates, S. (1993a). Speech, writing and computer conferencing: An analysis. In R. Mason (Ed.), **Computer conferencing: The last word** (pp. 37-56). Victoria BC: Beache Holme.

Yates, S. J. (1993b) **The textuality of computer-mediated-communication: Speech, writing and genre in CMC discourse.** Unpublished Ph.D. dissertation, Open University, UK.

Yates, S. J. (1997) Gender, identity and CMC. **Journal of Computer Assisted Learning, 13** (4), 281-290.

Zipf, G. K. (1949) **Human behaviour and the principle of least effort: An introduction to human ecology**. New York: Hafner.

Zuboff, S. (1988) **In the age of the smart machine: The future of work and power.** New York: Basic Books.

APPENDIX I: Transcript of messages: D2#1-12

MESSAGE 1.

Header: two ideas

Hello! Nice to see things moving!

Much impressed by (tutor's) analysis in Task 1, summary 2: the use of 'seminar talk'. So I'm trying to adopt it! But as a teacher of English, there are things I have misgivings about. I'll come back to this.

I'm glad to be able to conjure up a more vivid picture of who we are, thanks to your messages, Linda and Kate. It was good to get back last night after a hard day's work and 'feel the group' coming together in those brief lines you wrote.

Anne, are you there?! I reread your note in the cafe space, 8.1.01, which helps. Any more to add? I'm sure you have!

And finally, as regards our respective roles, can I ask Kate if she would consider conducting the interview, since from what you say, Kate, in your message, you feel comfortable with that?

So to work. Here are a couple of initial ideas I've been mulling over.

CMC: TIME AND SPACE TO THINK AND 'COMPOSE'

Here in France - don't know *how it is elsewhere* - learners in an English class are inhibited when having to enter into conversation with each other in a face-to-face context (f2f). They are afraid of appearing and sounding ridiculous in the eyes of their peers, and this diminishes their motivation.

In my slight experience, in the past few weeks, seeing learners on my DE course here in Lyon interact via e-mail, I realise that this problem no longer exists. I wonder how one can best exploit this space that CMC represents, in which learners can express themselves without fear of ridicule.

In more concrete terms, my question would be this. The asynchronous exchange of messages in CMC allows learners:

1. MORE TIME to construct their ideas;

2. A MEANS of formulating these same ideas - i.e. WRITTEN not SPOKEN - in such a way that errors in language or syntax cause less embarrassment, and in the long run hamper communication less than they would in a f2f context;
3. THE OPPORTUNITY to 'polish' their linguistic output before delivering it to others.
How does one construct a DE course in English using CMC in such a way as to build on these specific advantages of the tool that CMC represents?
I wonder if Linda feels the same about this from her experience?

MANAGING CORRECTIONS

Again, watching my learners, I realise that the quality of the English that 'circulates' can be poor. But let me say immediately that I am no amateur of the red pen and underlining mistakes three times! My rule of thumb is that if the message is successfully conveyed - be it orally or in writing - then correction of mistakes should be kept to a minimum to avoid demotivating the learner.
However, in this new age of 'global English' (or global English?) that we are entering on the net, all niceties of spelling and punctuation seem to be vanishing before our eyes!
How does the moderator of a DE course in English cope with this?
To illustrate this point, I cannot resist pasting in (tutor's) last message to us here. I hope she will not take it amiss!
'I'm sorry to put you in a group where you have no sepcial epertise, but theer are two reasosn for this:'
It made me smile. I understood the message, so there was no problem. But what if the message comes from the learner of English. Where do you draw the line? I always strongly advise all my learners to use the spellcheck in word processing programmes. Am I right?

Can you, Kate, Anne and Linda, see ways of posing these problems more succinctly. I feel a bit bogged down in details. I look forward nonetheless to building on these and other thoughts with you to get our questions together! Just one week to go!

MESSAGE 2

Header Re: two ideas

Yes I am happy to conduct the interview Nick. I have read your two questions and made notes - after reflection I will respond tomorrow and hopefully add an additional question proposal.

Kate

MESSAGE 3

Header: Re: (2) two ideas

So nice to hear back and so quick, Kate - great!

And since yesterday, I've been wondering whether you, Kate and Anne, have access to the texts in the bibliography that (tutor) recommends. As you know Linda and I do not. Perhaps if either of you have read something, it would be helpful if you told us what is worth reading. I'm contemplating ordering a very limited number of books and would welcome advice on what to buy. Is there no 'bible' on CMC?!

Nick

PS Copy of this request to (tutor).

MESSAGE 4

Header: Re (3) two ideas

The only book I have managed to get hold of so far was on the first reading list - Implementing Computer Supported Cooperative Learning by David McConnell. It was first published in 1994 with an updated second edition in 2000. It is good in the sense that it is easy to read and covers many of the issues related to cmc - tutoring, dynamics of group work, designing for cmc. It also has a first section on 'what is co-operative learning?' which I found useful in a general context sort of way. Towards the end he has a chapter on 'Trends and Developments' which is presumably the update - I haven't got to it yet but it includes : Networked lifelong learning, Just in Time Learning, IT based Open Learning. I am no expert but I would guess that this would serve well as a general reference text.

Kate

MESSAGE 5

Header: Re: two ideas

After thinking about the first of your questions Nick (more time, polish linguistic output before delivery etc) ..... I wonder whether it wouldn't be better to open it up a bit. Mason (did you manage to access this paper?) identifies what he terms' backbone elements' to online courses - asynchronous communication, real-time interaction and access to materials. I was thinking that perhaps we could ask - What criteria do you use as a course designer in deciding on the balance of these three elements? In this way we are setting your thoughts on asynchronous communication in a more general context but I feel we might glean additional material in her answer that we are not aware of. If, however, the broadening of the question produced an answer that you felt missed the point then we are able to go back once for clarification anyway.

My thoughts on the second question are not so developed but it seems to me that in your concern about correction you are starting to look at balancing accuracy and control against involvement and interactive confidence ..... this is a very important aspect I think which may impinge on task creation and assessment within overall course design.

One last thought is a possible third question - How can you develop a sense of community on an online course, which is based on the Just in Time principal and has students joining and leaving at different times?

That's all for now

Kate

MESSAGE 6

Header: Re(2) two ideas

Many thanks, Kate, for your reply. Have decided to break up our thread to make it easier for the others to 'jump in'.

Nick

PS Yes, have read Mason. I must re-read.

PPS Many thanks for recommending the McConnell book.

MESSAGE 7

Header: QUESTION ONE

QUESTION ONE

I agree we need to widen this question. But can we not weave in a small slant to those three points - asynchronous communication, real-time interaction and access to materials - to try and 'nail down' what I'm getting at?

I do wholeheartedly agree that we have the clarification safety net to narrow down a point, but if in her answer (the interviewee) doesn't broach what I'm getting at, I'm afraid it might slip thro our fingers!

What about keeping your three points and building in a slightly more complex question? Or am I being too pushy?! Over to you!

MESSAGE 8

Header: QUESTION TWO

QUESTION TWO

Let's keep thinking!

MESSAGE 9

Header: QUESTION THREE

QUESTION THREE

I'd like to explore this point too. Will get back to you Tuesday when I'm back home with time to muse.

MESSAGE 10

Header Re: two ideas

The bibles of CMC teaching are:

1. McConnell's book: Implementing Computer Supported Collaborative Learning (well-spotted Kate!)
2. Salmon: E-moderating

There is also the Moderator's Home Page, and McConnell's project home -page at Sheffield University.

I will get the URL's for these to you tomorrow, but I wanted to make a quick response.

Apologies for my sloppy editing.
(name of tutor)

MESSAGE 11

Header: Re (2): two ideas

Many thanks, (tutor). I shall order them immediately!

'Sloppy editing' is edifying, you know - despite what you say.

Best wishes,

Nick

MESSAGE 12

Header: The task

Hi Group,

I've been reading your contributions and I wanted to explore a few points further. How does (the interviewee) encourage fluency in speaking the language if she relies primarily on E mail? One medium that is mentioned in the course outline is the use of video. How does she use this medium? Does she use it to capture non-verbal as well as verbal communication and the intonations of different speakers of English? What other media does she use and how does she integrate them? Does she encourage her students to listen to the language as it is spoken on television programmes or audio cassettes or radio programmes? Do her students listen to the language as it is spoken around the world? Are the students ever placed in situations where they have to perform the role of interpreter at a conference? Does she set them questions that require them to listen to segments of the spoken word and then formulate replies using the Email? In short, what other media does she use to promote fluency in speaking the language? How does she integrate these other

media in her course? How does she balance the theoretical and the practical aspects of the course?

From the course outline, she also sets herself the goal of developing the capacity to take part in institutional planning and to direct English teaching and teacher training. She also addresses issues such as dyslexia. This would seem to require some networking with teacher training institutions around the world and with special educators and linguists. How does she achieve this within the context of an online course that relies on Email? Obviously their input would be important in developing course materials but does their participation end there? Lastly, what strengths and weaknesses has she encountered in using the *Internet and Email as* one of her principal modes of delivery?

Linda

APPENDIX II: Examples of the message types.

DEFAULT MESSAGE TYPE

Example: H4#3

Header: Further answers and seeking clarification

Here is (interviewee's) message to us:

Hello all
Thanks for including me in your work. I wish you well and please let me have some feedback on your outcomes. I am sending this now but will finish the rest later.
H.

We can go back to H once to seek clarification, so post any queries you have as well as any comments or thoughts on H's answers.

Best wishes, M.

INTERACTIVE-SOCIAL MESSAGE TYPE

Example: D5#27

Header: Re: D third landing

L, C, What about a quick chat about final details tomorrow night, at say 21:00GMT, that's 16:00 local time for you, L. Is that poss? If not, don't worry.
Yes, loved the third round from D. We'll have to tack on a big lump in 'Management of Learning' maybe to accommodate this?
Bonne journée!
P

INTERACTIVE-DIRECTIVE MESSAGE TYPE

Example: A5#4

Header: Re: What me now?

L is the structure ok?? -in "our summary" mon 21 feb

L, I'll summarise answer 5. If you can do rest 6-10, ---apart from 8, as R is providing an additional answer to this. (good idea, we will have further materials to think about)

J's extra info to question 2 can be added

R, what happens now? The deadline is for thurs /fri. Do you want me to start on:

2. A description of the group working process the group adopted
3. Some reflections on the experience.

regards

T

GIVEN MESSAGE TYPE

Example: R2#5

Header: Continuing

I have been looking at R's page. The one we got from (tutor name). There are a lot of powerpoint presentations. It seems that all these presentations were doing is to promote the University's distance learning programs.

There were some Word documents with some info and I will be looking at them later.

I managed to have a look at the article "Using computer mediated communication to deliver staff development", one of R's most recent publications. I could not find any other of his publications in the library. Can I assume that he has not written anything substantial?

In the article (the one noted above from Journal name) several issues were pointed out. Basically they are what we have and are experiencing ie.

Participants experiencing technical problems which stresses the need for adequate technical support.

The increased need for unambiguous instructions in the course design.

The need of the tutor to keep the students on track and

the confusion/ bewilderment that students experience in using CMC.

None of these seem to offer any possible question for the interview.

If we go back to what I said earlier i.e. the issues of culture. Bird & Nicholson (1998) argues "that global, technology-driven education may not be addressing the issues that impact on education effectiveness of learning for different people across the globe"(p.6) and that "the school education system in particular is seen as the structural foundation for a culture, and as providing an awareness of a large proportion of the 'social glue' of society"(p.9). .....

Can I have some feedback please?

RISKY MESSAGE TYPE

Example: D5#10

My next remarks are for P:

Yes, P, I was aware of a discrepancy in the focus of the questions and in D's response. As you correctly say we were talking about teaching and learning while D was talking about moderating teachers around the world. Also, I had a false conception of the course in that I thought that since it was open to teachers from around the world they would have varied considerably in their ability to speak the language. Apparently this is not the case. In my mind I must confess that lingering doubts exist but precisely because the choice of medium is CMC I doubt that these differences would necessarily be recognised.

The fact that e-mail allows for greater equality of participation is for me not the issue. For me the issue is improving teachers' ability to speak the language comfortably. You see, P, I spent seven years studying Spanish in high school yet I couldn't understand what Spanish speakers were saying to me! To this day my ability to read, write and understand the written language greatly exceeds my ability to speak it. I wonder if some of the MA students in D's course have the same problem? If they did, this could be hidden by online course delivery.

MIXED MESSAGE TYPE

Example: A5#6

Header: Re: Finishing off

Hello R, yes we need to get our responses into plenary. I have seen the response already there.

With your research we have extra info to incorporate into our summary of C's answers + J's and L's . In many ways this is just the start of the process of responding to ideas that you have put forward. With the deadline beckoning I need to be brief

Summary to Q5
C answered second part of question, taking the view that all CMC groups need to do is establish rules on plagiarism, as is case with libraries at the moment. Possibly in the plenary the whole debate on the extent to which CMC encourages active learners and transforms the role of the teacher (from the sage on the stage to the guide on the side) can be started.

Reflections on the experience
At first it was very difficult to familiarise myself with the technology. This actually got in the way of any form of communication. Debates could move very quickly and to not log-on for more than 5 days made it difficult to "catch up".

The group was supportive and as we worked towards deadlines it felt as though real collaborative work was happening. The role of co-ordination was therefore crucial -- thanks to the hard work of R. With more time the collaboration could develop into sharing ideas on reading. Also the work the group did on special needs was interesting and was reaching conclusions that greatly differed from our interviewee. (Actually this is an example of shared research and reading)

R, hope this is enough. I am not going to be able to log on tomorrow

I don't think we need to do too much. We can always add stuff in the plenary. It must be hard work putting it all together

See you

T

Many thanks for the co-ordination

APPENDIX III: Results

Note 1: The print of the Excel database presents:

1. The distribution of the 6 message types and the 13 general discourse and the 6 learning analysis categories across the corpus of 334 messages.
2. The distribution and occurrence of the 13 general discourse categories and the 6 learning analysis categories *across the* message types.

Note 2: The chart presents a graphic representation of the distribution of the 13 general discourse and the 6 learning analysis categories across the 6 message types.

Note 3: Summary of the categories:

Category number	Message type	Diagram name
1	Default	Mdefault
2	Interactive-social	MinterS
3	Interactive-directive	MinterD
4	Given	Mgiven
5	Risky	Mrisky
6	Mixed	Mmixed

Category number	General discourse category	Diagram name
7	Aizuchi	aizuchi
8	False (indirect) repair	Idfrepair
9	Indirect expression of epistemic uncertainty	Idepuncert
10	Indirect command	Idcommd
11	Indirect expression of propositional content	Idinfprop
12	Use of GCI- M-inference	IdMinf
13	Direct request for feedback	Dreqfdbk
14	Direct command	Dcommd
15	Direct expression of emotion	Demote
16	Cohesive echo/reiteration	Cohecho
17	Cohesion -anaphora	Cohanaph
18	Self-repair	Repself
19	Repair directed to another person	Repother

Category number	Learning analysis category	Diagram name
20	Learning platform	Lplat
21	Learning probe 1/general prompt	Lprobe1
22	Learning probe 2/request for repair	Lprobe2
23	Learning probe 3/feedback	Lprobe3
24	Learning probe 4/challenge	Lprobe4
25	Reflection on learning	Lreflect

Note 4: The diagrams present the results for the general discourse categories and the learning analysis categories. Categories 7-19 are the general discourse categories, as derived from the coded data. Categories 20-25 relate to the analysis of the coded data within the framework of Laurillard's model of learning through conversational dialogue.

Mdefault y	MinterS y	MinterD y	Mgiven y	Mrisky y	Mmixed y	aizuchi y	Idfrepair y	Idepuncert y	Idcommd y	Idinfprop y	IdMinf y	Dreqfdbk y	Dcommd y
76	62	79	60	18	39	63	7	32	129	58	59	100	67
23%	19%	24%	18%	5%	12%	19%	2%	10%	39%	17%	18%	30%	20%

	7	8	9	10	11	12	13	14
	aizuchi	Idfrepair	Idepuncert	Idcommd	Idinfprop	IdMinf	Dreqfdbk	Dcommd
Mdefault	13	1	2	23	6	7	9	11
	17%	1%	3%	30%	8%	9%	12%	14%
MinterS	22	0	1	17	10	4	9	2
	35%	0%	2%	27%	16%	6%	15%	3%
MinterD	7	3	8	38	13	18	37	28
	9%	4%	10%	48%	16%	23%	47%	35%
Mgiven	14	1	14	19	17	12	17	9
	23%	2%	23%	32%	28%	20%	28%	15%
Mrisky	1	0	5	8	2	4	8	0
	6%	0%	28%	44%	11%	22%	44%	0%
Mmixed	6	2	2	24	10	14	20	17
	15%	5%	5%	62%	26%	36%	51%	44%

	7	8	9	10	11	12	13	14
Mdefault	17%	1%	3%	30%	8%	9%	12%	14%
MinterS	35%	0%	2%	27%	16%	6%	15%	3%
MinterD	9%	4%	10%	48%	16%	23%	47%	35%
Mgiven	23%	2%	23%	32%	28%	20%	28%	15%
Mrisky	6%	0%	28%	44%	11%	22%	44%	0%
Mmixed	15%	5%	5%	62%	26%	36%	51%	44%

Demote	Cohecho	Cohanaph	Repself	Repother	Lplat	Lprobe1	Lprobe2	Lprobe3	Lprobe4	Lreflect	TOTAL
y	y	y	y	y	y	y	y	y	y	y	
114	76	144	16	33	54	64	25	60	13	54	1105
34%	23%	43%	5%	10%	16%	19%	7%	18%	4%	16%	
15	16	17	18	19	20	21	22	23	24	25	
Demote	Cohecho	Cohanaph	Repself	Repother	Lplat	Lprobe1	Lprobe2	Lprobe3	Lprobe4	Lreflect	
18	7	16	1	5	24	15	6	13	2	8	174
24%	9%	21%	1%	7%	32%	20%	8%	17%	3%	11%	
36	15	23	4	0	1	2	0	5	0	3	132
58%	24%	37%	6%	0%	2%	3%	0%	8%	0%	5%	
24	17	43	4	17	2	15	4	14	2	11	298
30%	22%	54%	5%	22%	3%	19%	5%	18%	3%	14%	
13	19	39	5	4	10	12	9	18	3	12	233
22%	32%	65%	8%	7%	17%	20%	15%	30%	5%	20%	
5	8	5	0	0	8	5	1	5	4	7	75
28%	44%	28%	0%	0%	44%	28%	6%	28%	22%	39%	
18	10	18	2	7	9	15	5	5	2	13	193
46%	26%	46%	5%	18%	23%	38%	13%	13%	5%	33%	

15	16	17	18	19	20	21	22	23	24	25
24%	9%	21%	1%	7%	32%	20%	8%	17%	3%	11%
58%	24%	37%	6%	0%	2%	3%	0%	8%	0%	5%
30%	22%	54%	5%	22%	3%	19%	5%	18%	3%	14%
22%	32%	65%	8%	7%	17%	20%	15%	30%	5%	20%
28%	44%	28%	0%	0%	44%	28%	6%	28%	22%	39%
46%	26%	46%	5%	18%	23%	38%	13%	13%	5%	33%